DEC 27 1926

Medical Library

The

British Medical Journal

THE JOURNAL OF THE BRITISH MEDICAL ASSOCIATION.

Including an Epitome of Current Medical Literature.
WITH SUPPLEMENT.

No. 3440. SATURDAY, DECEMBER 11, 1926. **Price 1/3**

In the Insulin Treatment of Diabetes the diet is still a factor of vital importance.

'Allenburys' Diabetic Flour

Is a special preparation of caseins and lactalbumen to which leavening agents are added.

It is a satisfactory and convenient product for the preparation of special foods, free from carbohydrates, and containing a minimum of fat; or definite proportions of these may be added as tolerance increases with the progress of the treatment. The 'Allenburys' Diabetic Flour is compact, convenient to use, and keeps well. From it may be prepared a variety of palatable and highly nutritious foods of special composition. Recipes and directions for use are enclosed with each packet.

COMPOSITION:	Per cent.
TOTAL PROTEINS	87·0
FAT	0·7
SODIUM BICARBONATE	1·6
ACID POTASSIUM TARTRATE	1·6
MOISTURE	9·1

Calorific Value—303 calories per 100 grammes or 1,376 calories per lb.

Further particulars and clinical trial sample will be sent on request.

Allen & Hanburys Ltd., 37 Lombard Street, London, E.C.3

CANADA: 66, Gerrard Street East, Toronto.

West End House: 7 VERE STREET, W.1

UNITED STATES: 90-92, Beekman Street, New York City.

those who are known to suffer in this way in the winter. (3) Milk at 11 a.m.—a quarter to half a pint. (4) Some fresh fruit every day. These measures will prevent chilblains in most cases. To heal them ultra-violet rays are a great aid, and it is fortunate that we have this extra means now at our disposal to cure this complaint. The giving of calcium salts I have found to be disappointing, but the help given by (2), (3), and (4) goes a long way towards preventing this trouble.

INCOME TAX.

Assessment of Practice.

"C. W. S." is part proprietor of a practice which has been assessed on the cash basis for thirty-five years. The authorities now desire to change to the basis of "fees earned"—less, presumably, an allowance for probable bad debts—and further to revise the assessments already made from 1920–21 onwards.

*** As we have always admitted, the cash basis is not technically correct in strict law, and its acceptance is based on mutual convenience and on the assumption that in the long run the results derived from the two methods are substantially the same. "C. W. S." is willing to agree to an alteration for the current year, but we think he is acting only reasonably in objecting to the reopening of the liability for previous years. Assuming that there have been no special circumstances which have rendered the cash basis unfair to the revenue, and bearing in mind that inspectors of taxes have accepted that basis in the past and that in doing so they have followed a common practice within the cognizance of the authorities, we suggest that, if the local inspector continues to press for a revision of past assessments, "C. W. S." should place all the facts before the Secretary, Board of Inland Revenue, Somerset House, W.C.2, and ask that the local official should be authorized not to insist on the application of the "fees earned" basis to years prior to 1926–27.

Depreciation of Motor Cycle.

"F. M. W." has been informed by the inspector of taxes that "depreciation in respect of the motor cycle is not allowable as an expense if repairs, etc., are allowed."

*** The statement seems to be based on a misunderstanding. The depreciation allowance excludes a claim to deduct the cost of replacing the vehicle used, but not running costs. It must surely be obvious that such expenses as petrol, oil, licence, and replacement or repair of parts are allowable, however the gradual exhaustion of the vehicle by wear and tear may be dealt with in the returns.

LETTERS, NOTES, ETC.

AN APPEAL.

DR. HILDRED CARLILL (Physician to Westminster Hospital) writes from 146, Harley Street, W.: A medical man, aged 70, who has no knowledge of this appeal, is sorely pressed. Twenty years ago he was advised on medical grounds to leave his general practice. His health recovered, and for many years he has been able to act as a locumtenent, doing work which has kept him alive, but which has prevented him putting by. His wife, who is in indifferent health, does what she can by dressmaking. Of four sons who would now all be helping, three died at the age of 21 (one, my friend in another ship, in the *Queen Mary* at Jutland, and one of cerebro-spinal meningitis at St. Omer). The remaining boy is in the air branch of the navy, and he sends home the little he can afford. Recently a prolonged illness, lasting over four months and necessitating several operations, has prevented the doctor from earning a penny, and his financial state is critical. A friend has opened a subscription list with £50, and I, who know the facts, shall be very glad to receive, acknowledge, and forward subscriptions from sympathetic professional colleagues. Perhaps someone may know of an opening for the doctor on the clerical side of a hospital or its appeal department, or of a medical or other society. He aspires only to a small living wage, and for this he would do first-rate work.

THE CANCER PROBLEM.

DR. A. T. BRAND (Driffield), in the course of a letter on this subject, writes: Dr. Gye, in his interesting lecture published in the JOURNAL of November 13th, states that he has succeeded in isolating a "living filterable microbe" which he believes to be the cause of new growths; but he insists that the microbe can only act in conjunction with an accessory chemical substance, which determines the special characters of the resulting cancers. I maintain that, since cancer does not arise in the perfectly healthy subject, there must be a predisposing condition precedent in every case before the causal microbe can attack successfully. One of the chief predisposing agents is prolonged irritation, which prepares the soil for the reception of the micro-organism. The special characters of the resulting cancers depend on the variety of tissue involved. Nor is the filterable virus described by Dr. Gye the only form of the microbe responsible for cancer. Several years ago both Dr. T. J. Glover of Toronto and Dr. J. Young of Edinburgh isolated and cultured, from every variety of malignant disease, the same micro-organism, which they found to be pleomorphous, its life cycle consisting of bacillus, coccus, spore sac, all easily visible under the microscope, and a filter-passing phase, which is ultra-microscopical under ordinary circumstances, but evidently the same as the filterable virus of Dr. Gye, rendered visible by the special method of Mr. Barnard. Dr. Glover scrupulously refrained from making his researches known until he had completed them to his satisfaction, but now he has made a full communication, which has been published in the November issue of the *Canada Lancet and Practitioner* of Toronto. In this communication Dr. Glover describes his discovery, the isolation and culture of the micro-organism, the successful propagation of the disease from cultures among the lower animals of all kinds, the injection of the toxin of the organism into the horse, resulting in the production of an antitoxin which he has used for diagnosis, prophylaxis, and treatment, concluding with a detailed account of fifty cases of successful treatment of advanced disease.

A LONDON CLINIC FOR PHYSIOTHERAPY.

THERE will shortly be opened in London, near Victoria Station, an out-patient clinic (to be called "The London Clinic") for the study and practice of "physical" treatment. The medical staff will be entirely honorary, and the treatment, we are informed, will be available for those who cannot afford to pay for its private administration. Courses of lectures and practical instruction will be held for doctors and medical students. There will also be courses for hospital nurses, and for masseuses. Each department will be supervised by one or more medical men who have specialized in the particular branch, and an honorary medical director will co-ordinate the work of all. There will be two large artificial light departments, one for women and children, the other for men, each equipped on a scale that will enable them to treat 1,000 patients in a day, and the clinic will gladly extend to insurance practitioners and school doctors facilities for the attendance of debilitated school children. The light treatment will be administered solely by generally trained hospital nurses, and the treatment in the electricity department, also under medical control, will be given by masseuses holding the medical electricity certificate of the Chartered Society of Massage and Medical Gymnastics, and those who hold this certificate will be eligible for a special course and examination in "orthopaedic electricity." This course is designed to turn out a masseuse competent to treat orthopaedic disabilities, including the effective stimulation of muscles or groups of muscles. The work of this department will thus consist of the ordinary "medical" electricity and "orthopaedic" electricity. There will be a special department for diathermy applied to certain conditions in women, such as dysmenorrhoea and infective cervicitis; this treatment will be administered by the medical officer himself. Massage will be co-ordinated with the electricity department, and remedial exercises will have an important place. A covered exercise ground is being constructed, and the Margaret Morris system of exercises has been selected as specially suitable for classes of children, supervised by Miss Morris herself. The organization outlined above has been made possible by the British Humane Association, which has guaranteed the entire cost of construction. The hope is entertained that this teaching clinic will rescue the practice of physical treatment from lay hands and place it in those of qualified medical practitioners. It has been thought advisable in the first instance to form a small nucleus staff of honorary medical officers sufficient to begin with, but vacancies on this staff will be advertised in due course in the medical journals. The present nucleus staff consists of Dr. G. Murray Levick (medical director), Mr. J. F. Carter Braine, F.R.C.S., Dr. L. D. Bailey, M.C., Dr. E. P. Cumberbatch, and Dr. C. A. Robinson.

PUBLIC HEALTH IN GERMANY.

DR. BINNIE DUNLOP (London, S.W.7) writes: Professor Abel is reported (November 6th, p. 846) as having said that "in Germany the last figures showed that the population had diminished in a year by half a million." According to my notes he said that Germany's population was still increasing. In any case, one of his charts showed that the birth rate and death rate per thousand of the population had been approximately 36 and 21 in 1900, 28 and 16 in 1913, 22 and 12 in 1925—representing in 1925 an addition of about 670,000 inhabitants. Why, it might be asked, did the death rate fall thus? Surely it was mainly because the declining birth rate continually reduced the proportion of badly nourished persons; and this contention is supported by the dramatic rise of the tuberculosis mortality in Germany during the war which Professor Abel demonstrated.

*** "Diminished" was a slip of the pen. The increased tuberculosis mortality experienced not only in Germany but in other European countries, including England and Wales, is commonly attributed to the diminished food supply. The Malthusians would probably attribute the fall in the death rate of Germany to a reduction in the proportion of badly nourished persons, but a more widely accepted view is that the improvement of sanitation and of the well-being of the population generally, including better nutrition, is responsible.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 66, 67, 68, 69, 72, and 73 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 70 and 71.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 239.

British Medical Association.

PROCEEDINGS OF SECTIONS AT THE ANNUAL MEETING, NOTTINGHAM, 1926.

SECTION OF SURGERY.

Sir D'ARCY POWER, K.B.E., M.B., F.R.C.S., President.

DISCUSSION ON CARCINOMA OF THE TONGUE.

OPENING PAPERS.

I.—DUNCAN C. L. FITZWILLIAMS, C.M.G., M.D., CH.M.EDIN., F.R.C.S.,
Surgeon to and Lecturer on Surgery, St. Mary's Hospital, London.

THE SURGICAL ASPECT.

Preliminaries.

THERE is hardly any situation in the body in which the success of the operation and the comfort of the patient depend more upon the preliminary attention and training of the patient than in cancer of the tongue.

The buccal cavity is a septic cavity; it is more septic where ulceration is taking place or where carious teeth, pyorrhoea, and other obvious foci of sepsis are present. The effect of sepsis, as in the case of other poisonous drugs, is a matter of dose and concentration. A small dose of morphine may be beneficial; a larger one produces deep sleep; and a still larger one kills the patient. A small dose of sepsis produces a slight elevation of temperature, and is often seen after so-called aseptic operations; a larger one produces rigors, breaking down and suppuration of wounds, according to its intensity; a still larger one causes pyaemia and the death of the patient. As, therefore, we cannot altogether eliminate sepsis from our procedure in the mouth, we must diminish the dose as much as possible.

All carious teeth or teeth around which there is suppuration in the gums should be removed, also septic tonsils. A strong antiseptic mouth-wash of carbolic should be used constantly for some days by the patient. A very good and pleasant mouth-wash is the following: Phenol pur. 1 oz., tinct. lavandulae 2 oz., water to 6 oz.; 1 oz. to a tumbler of warm water. This mouth-wash should be held in the mouth for some time, the patient breathing through the nose. The ulcer on the tongue can be dried and the ulcerated surface touched with a pledget of cotton-wool or a brush dipped in pure carbolic acid or 20 per cent. chromic acid twice a day, taking care that none of the acid spreads beyond the ulcer. In this way we can ensure that the buccal cavity contains as few septic organisms as possible.

The operation will upset the important function of swallowing, and to a less extent breathing and coughing. We little realize how much we are dependent on the action of swallowing for our comfort. Not only do we swallow food, but we are constantly swallowing saliva. The flow of saliva we can diminish by rinsing the mouth out with an astringent, such as an infusion of orange peel.

After the operation for removal of the tongue swallowing is completely upset: the liquids taken through the mouth must be poured down by means of a feeding cup and long rubber tube which extends to the back of the throat. There is always some difficulty in tolerating things at the back of the throat and guiding fluids past the opening of the glottis. This should be acquired by practice some days before the operation. The patient takes the feeding cup in one hand and passes the tube into the pharynx, the tube is pinched by the other hand and the cup tilted; by relaxing the tube fluid is allowed to flow into the throat and is swallowed. Some practice is needed. For these reasons it is better that the patient should go into a nursing home for a few days before the operation. In many advanced cases the man is enfeebled by pain, inability to swallow, sleeplessness, and the continual absorption of sepsis. These should be obviated as far as possible. His health should be sustained and improved by good food, enemata being given if thought necessary; sleep should be procured by sedatives, and the measures just detailed followed to finish the oral sepsis. A rest in bed for part of the day will do him good.

There is always some difficulty in getting a patient to submit to these measures, as, having made up his mind to undergo an operation, he wants it performed at once. An operation is not a pleasant thing to look forward to; he knows it must bring him considerable discomfort; it is not without risk, but having once screwed himself up to the point he wishes to diminish the period of anxiety. He does not appreciate or pay any attention to the preliminaries which are so necessary for success. This is natural in an elderly individual whose peculiarities, crotchets, and eccentricities have all been exaggerated by a painful illness. A patient who can take a placid and common-sense view of the proceeding and who will help the surgeon is a great asset; this attitude goes a long way towards recovery.

Choice of Operation.

The first thing to be decided upon is whether the operation can be an intrabuccal operation, such as that which we associate with the name of Whitehead, or whether it has to be one which demands division of the jaw, to which the name of Syme is attached.

This may be left to the individual view of the surgeon, but we are all guided by the fact that an intrabuccal operation is suitable for every case in which there is no extension to the floor of the mouth, no implication of the lower jaw, and no involvement of the anterior pillar of the fauces, tonsil, or palate; and perhaps we might add where the growth is not situated too far back upon the tongue. In cases where the growth has extended to these situations there is no doubt that division of the jaw may give better access. Over a large number of cases of operation collected from different sources the difference in the operative mortality between the two operations is very marked, that of the intrabuccal operation being exactly one-quarter that of the operation requiring division of the jaw.

Methods of Approaching the Operation.

These are perhaps the most important points in what I am going to say. I am going to ask you to throw upon the scrap-heap almost the whole of the ordinary procedure of the usual operation.

I think I may say that the usual procedure for an intrabuccal operation is the following: An incision is made in the neck, the lingual artery is tied, the submaxillary gland removed and any carotid glands which may be seen; the tongue is then removed. The wound in the mouth, as a rule, communicates with that in the neck, so that it is advisable to have the neck dissection as small as possible. If the whole tongue has to be removed the same procedure may take place upon both sides of the neck—a long and trying operation for an old man. The operation is not difficult, and almost any careful surgeon can carry it out with a very small operative mortality. The after-history, however, is melancholy in the extreme. It is not too much to say that the after-results are as bad as any we have in surgery. This, in my opinion, is due solely to the procedure adopted, and I do not think any modern surgeon would approach the problem in this way if he was not guided and bound by tradition and wont.

The operation consists in removing the growth and the lymphatic field. This cannot be done adequately at one operation, as the mouth and the neck will communicate, and there will be a huge septic wound. It must, therefore, be done in two stages; it is obvious that the neck dissection, which is almost more important as regards prognosis than the mouth operation, must be as thorough as possible, and accordingly should not be handicapped by the scar tissue of a previous operation. This at once brings us to the question of the ligation of the lingual artery, and here I may say that I believe the ligature of the lingual artery will soon become a discarded procedure; it has had its day, and is no longer necessary.

At a time we can all remember, when the surgeon, the assistant, and the anaesthetist fought for the temporary possession of the patient's mouth, there was a constant risk of blood being sucked into the larynx, and the control of haemorrhage was of vital importance; now, however, with the laryngotomy tube and the pharynx plugged, it is of no consequence. Having, therefore, done away with ligature of the lingual artery, would any surgeon proceed

INVARIABLY
Sterile; strong; compatible; neutral; flexible; accurately gauged; exactly chromicized

Dependable

C. F. THACKRAY ▾ PARK STREET, LEEDS ▾ 119 HIGH HOLBORN, LONDON, W.C.I

BRANDY
for
ILLNESS
means
MARTELL

A Necessity in The Hospital The Nursing Home The Sick Room

Invaluable to The Physician The Surgeon The Patient.

cautions are taken, at the end of the operation it will be found that the water is cold and useless for the purpose of warming the vapour.

If a preliminary injection of morphine be given it should be a small dose. Hewitt has emphasized this; he had two or three fatalities, which were, he writes, "in my opinion, partly, if not chiefly, due to pneumonia excited by the passage of blood into bronchi rendered insensitive by morphine. The profession has not, I think, fully realized the importance of a rapid return of the coughing and swallowing reflexes after operation of this character."

With this opinion I cordially agree.

Partial or Unilateral Excision.

The patient being anaesthetized through a laryngotomy tube and the mouth gagged widely open, a stout silk ligature is placed through the anterior part of the tongue on each side. If the growth is far back it is an advantage to place one through the tongue behind the growth, as pulling on this will bring the back part of the organ much better into view. The pharynx is then plugged by a marine sponge to which a string is attached, which hangs out of the mouth.

The tongue being steadied, an incision is made through the mucous membrane suitable for the removal of the particular growth. In making this incision it should be remembered that a carcinoma does not spread laterally along the mucous membrane but along the lymphatics deeply into the substance of the tongue. There is no need, therefore, to remove the mucous membrane widely, and much more can be left to cover the raw surface of the mouth than is usually done. I do not for a moment wish you to think that the growth should be encroached upon: a full three-quarters of an inch should be left round the growth, but in a growth at the middle or behind the middle of the tongue it is unnecessary to remove the tip or mucous membrane of the under surface of the tongue.

The mucous membrane having been divided the two halves of the tongue can be separated; the mid-line should be closely inspected to see if there is any sign of the growth penetrating to the centre of the tongue. The tongue is then elevated and the origin of the genio-hyo-glossus muscle separated from the genial tubercle on the affected side. The stylo-glossus muscle in the anterior pillar of the fauces is divided.

On pulling the tongue upwards and to the opposite side the hyo-glossus muscle will be placed on the stretch. A director is inserted under this muscle, which is divided, exposing the lingual artery for the whole length of its second part. A ligature can be passed round it with an aneurysm needle, or the vessel may be caught with forceps, divided, and ligated. It should be ligated at once; if forceps are left on they are in the way and are apt to tear off or become loose, and the vessel may then bleed. This is the method of dealing with the vessel devised many years ago by Charles Cathcart. When the vessel has been secured some snips may be made into the tongue just where it has been caught to avoid injuring the vessel later. This is a better method of securing the lingual artery than snipping the tongue through in the hope of recognizing the vessel before it is out. The tongue can now be pulled further out of the mouth. By pulling on the back silk suture the hind part of the tongue can be better displayed. With snips of the scissors the tongue is now divided transversely well behind the growth. The face of the section should be closely inspected to make sure that infiltration has not reached it. Some twigs from the dorsalis linguae vessels may need to be secured. The tongue should now be turned round so that the tip is sutured to the base and the mucous membrane of the mouth stitched up as well as possible so as to diminish the raw area left. In many cases of partial excision, if thought has been given to this matter there is practically no raw area left, and the comfort of the patient is enormously increased; healing should be complete in most cases in ten days. The plugging is removed from the pharynx and the laryngotomy tube withdrawn, when the patient will at once breathe through the natural channel. A small dressing is applied to the neck, and the patient is then removed to bed. The operation is nearly as bloodless as when the lingual artery has been secured in the neck.

In complete excisions, where the whole of the tongue has been removed, the lingual artery is dealt with first on one side and then on the other.

If the tongue is divided very far back a silk suture should be placed through the glosso-epiglottidean fold and left hanging out of the mouth to draw forward the hyoid bone if necessary. It can usually be removed within twenty-four hours. The oozing can be stopped by applying a hot sponge to the raw surface. The tongue having been removed, the mucous membrane is sewn up, covering the floor of the mouth, part of the mucous membrane of the anterior pillars of the fauces being used for this purpose.

Some surgeons have advocated splitting the tongue and removing half at a time. Removal of the whole tongue, however, means that both halves are infiltrated, and longitudinal division means that infected or suspicious tissue must be cut through. This is a bad practice, as cancer cells may escape during the operation and may cause a local recurrence later.

Treatment of the Stump.

If the flaps have been cut with foresight and precision and the mucous membrane has been sewn up carefully, it is surprising what a small raw area need be left. What there is can be painted with warm friars' balsam; there is no advantage in adding iodoform to this. Swallowing is much less painful where there is only a small raw area. No dressing whatever need be applied, as it only distresses the patient to have foreign substance, gauze of all things, in the mouth. The stitch in the back of the stump is fastened to the cheek by a strip of plaster.

After-treatment.

Good after-treatment adds much to the comfort of the patient. The patient is returned to bed and laid upon his side with the head low, so that all mucus runs from the mouth on to a soft towel laid under the cheek. The nurse should be told to wipe away mucus from the lips, but on no account to insert anything into the mouth, or she may tear the sutured mucous membrane. Morphine should be withheld so that the patient returns to consciousness as soon as possible and is able to cough. A continual rectal saline can be given through a fine catheter without disturbing the patient. To this may be added brandy, bromide, chloral, and glucose, as thought necessary.

As soon as the patient regains consciousness sufficiently he should be propped up in bed with pillows. He is then taught to wash out his mouth himself whenever he feels inclined. For this a douche can be suspended near the head of the bed a few inches above the level of his mouth. He takes the tube, places it in his mouth, and allows the fluid to run in while he bends his head over a basin held by the nurse. He regulates the flow by pinching the tube. The patient much prefers to do this rather than have it done for him, as he can direct the stream where he wants it. The best fluid he can use is warm potassium permanganate, or warm 1 in 80 carbolic lotion. He will find these most comforting, and will probably use them frequently.

As a rule the patient can swallow the next day, and can be fed by the feeding cup and tube, which he has already accustomed himself to use previous to the operation. If there is any difficulty, he can be fed by passing a small, well oiled catheter a little way down into his oesophagus and allowing small quantities to run in slowly. Should any regurgitation or coughing take place the feeding cup or funnel should at once be lowered. The patient will probably prefer to feed himself.

A little water should be run in first to test that all is well; a little more can be run in to clear the tube before withdrawing it. In a few days the patient will be able to swallow quite well himself.

It is hardly necessary to add that all fluids used should be sterilized by boiling before use. A patient who cannot be fed in this way must be placed upon rectal enemata, upon which he may subsist for some days, until swallowing has become easy.

Time does not allow me to say much in connexion with the dissection of the neck. This, however, is just as important as the removal of the tongue. To be successful the

to perform a preliminary dissection of the glands in the neck in an adequate manner with the knowledge that the fascial planes were liable to be infected from the mouth? If he were tempted to do it on one side, would he do it on both? The answer is, Never.

A dissection of the neck is an operation which should be complete, and not a mere adjunct to the ligature of the lingual artery, as it now is in many cases. It is an operation which ought to be thoroughly carried out, and the whole gland-bearing fascia of the neck should be cleared from the great vessels. This is the one chance we have of dissecting in the undisturbed fascial planes, and no subsequent operation can be anything like as easy and as thorough. It is a long operation, and doubly so if both sides of the neck are to be dealt with. Moreover, considering the stage of the disease in which we see most of our cases, the safety of the patient lies entirely in the thoroughness with which this part of the operation is performed.

I believe that the proper method of dealing with the situation is to remove the tongue locally, first, as widely as is thought necessary, and then let the mouth wound heal, and a fortnight later deal with the neck. The flow of lymph during that fortnight must be very slight, as the site from which it flows is removed. Spread of the disease during that time is not to be feared, as the cancer is no longer present. This is far better than doing the neck first, and at the same time taking the opportunity of ligating the vessels, and then, when the neck wound is healed, dealing with the tongue. In this case the lymph is flowing from the cancer, and is going by roundabout routes, the limits of which we do not know, to the same side or to the opposite side of the neck; at the same time the collateral circulation is opened up, and instead of a blood supply the anatomical relations of which are well understood, we have one which is unknown, but is just as free. I merely state this as a common-sense view to take of the matter, and one which I now always follow, though I am well aware that many surgeons reverse the process, and most of the cases operated upon in the Mayo Clinic between the years 1910 and 1922 had the glands removed first.

The Anaesthetic.

This is a most important subject, and must be dealt with fully. A good anaesthetist is as important as a good surgeon; and by a good anaesthetist I do not mean one who anaesthetizes so that the patient can leave the operating table alive, but one who acts for the ultimate good of the patient.

There are four methods of anaesthetizing, all of which I have used.

First, there is the ordinary way of anaesthetizing by the mouth, at first by means of a mask, followed by some such apparatus as Junker's. This method has almost completely gone out of use; there was far too great a risk of the suction of blood and mucus into the upper bronchial passages, and consequent pneumonia. This method, however, is still used and even advocated by some.

There is the method by tracheotomy and the plugging of the pharynx—an excellent method, but a severe procedure, as the tracheotomy takes some time to perform, the wound does not heal at once, and there is an added risk of sepsis; still it is a great step in advance. The patient, however, is deprived of the ability to cough and clear his pharynx for some days after the operation.

Then there is laryngotomy. A small opening is made through the crico-thyroid membrane and a narrow tube thrust into the larynx, and the anaesthetic given through that, the pharynx being plugged. A small, flat laryngotomy tube is used or a bivalve tracheotomy tube; the opening takes only two or three minutes to perform. A small transverse incision is made and the membrane stabbed so that there is only a small hole, into which the tube fits so tightly that there is no bleeding. The tube is removed when the operation is finished; the sides of the wound come together, no air escapes, no emphysema occurs, and coughing is at once restored to the patient. This is by far the best of the methods used at the present day.

Lastly, there is the method of intratracheal delivery of the anaesthetic. This seemingly has very great advantages, but they are more apparent than real. It gives a very nice quiet anaesthetic, but continual swabbing of the throat is necessary. It must be remembered, too, that as the entrance to the glottis is narrowed by the tube, the force with which material can be sucked in is proportionately increased, and there is a liability that pneumonia will follow. Also it is not always easy to introduce a tube into the larynx. Anaesthetists will say that it can be done with a mirror, and the tube not contaminated in any way from the ulcer. That may be so, but my experience has been that when the patient has arrived upon the table with the tube in place there are often evidences that it has not been altogether plain sailing, and, besides a considerable loss of time, I have frequently found that there was free bleeding from the ulcer. Pulling, tearing, or massaging of the ulcer is the last thing that is desired.

I share the opinion expressed by Trotter in this matter—that where there is a fungating mass in the mouth laryngotomy is the best procedure. Much time may be lost in attempting to pass the tube, during which the breathing may be seriously embarrassed, and an additional strain of unknown weight added to the seriousness of the operation. Be it remembered that most of these patients are old men, and any additional heart strain is to be avoided.

About the same time that Trotter expressed this opinion Rupert Jones published his experience of anaesthesia by this method. Two tongue cases were included. In the first, a man of 52, the tube was passed without difficulty; four days later the patient developed signs of pneumonia at the right base and died in a week. In the second, a man of 55, "intubation was repeatedly tried for thirty minutes" without success; laryngotomy was then performed. The patient died suddenly of heart failure twenty-eight hours later. A thirty minutes' struggle is hardly a happy preliminary to a serious operation, and probably contributed materially to the sequel. Trotter carefully limits his remarks to fungating tumours of the tongue, and excludes small warty or superficial growths where ulceration is absent or slight. I go further and hold that intratracheal anaesthesia for all serious intrabuccal operations upon the tongue is much inferior to laryngotomy from the surgeon's and from the patient's point of view; and I have had a large experience of both forms given by such excellent exponents as Dr. Chaldecott and Dr. Matthews. I therefore repeat that for the ultimate good of the patient the anaesthetic should be given by a laryngotomy tube; there should be no preliminary ligature of the lingual artery, and the neck should be left untouched till a later date and then dealt with as thoroughly as possible.

Wheeler[1] strongly recommends rectal anaesthesia, and states: "It is the method *par excellence* for excisions of the tongue or jaw and for the removal of goitre or glands in the neck." Its advantages are not quite obvious, and the pharynx cannot be plugged; but I have had no experience of the method and cannot judge.

There is another important point in the anaesthetic which it behoves the surgeon to inquire into. We know that the number of deaths upon the table is greater with chloroform than with ether. I am certain, however, that if the deaths were taken for fourteen days from the commencement of the operation the figures would be reversed, and the ether deaths would exceed those of chloroform in a most decided manner. The older the patients operated upon the more pronounced will this be.

The risk of death upon the table has, in my opinion, been allowed too great an influence in the matter of anaesthetics. The irritation of the ether is very marked in some people; we recognize this, and now in every case give atropine to counteract its action. Nature intended us to breathe through our noses and provides a large surface of epithelium to warm the air breathed, so that cold air shall not find its way into the lungs. Ether, being a vaporable fluid, becomes cold, and if delivered direct into the lungs through the opening in the trachea, larynx, or by the intratracheal tube, must be a most potent factor in the fatalities which ensue. The ether must be warmed, and if the operation is prolonged additional hot water must be added to the apparatus; unless pre-

applicators. If, on the other hand, the embolic theory of transmission be accepted, then free surgical removal of all infected and non-infected glands is imperative, followed, if thought advisable, by surface radiation. The treatment of secondary deposits presents even greater difficulties than the treatment of the primary lesion, and ultimate success will be found to hinge largely upon the efficiency with which the infected lymph nodes and their tributaries have been removed or radiated. An important point to note in cases of cancer of the tongue is that lymphatic extension beyond the submaxillary and cervical triangles is rare.

The placing of superficial applicators containing radium over masses of enlarged glands is not only an uncertain but also an unsatisfactory method of treatment, owing to the tolerance of the skin, which varies within such wide limits. The burying of tubes in the substance of glandular deposits in such a way as to form a barrage and secure efficient cross-fire is attended at times by shrinkage and disappearance of obviously enlarged nodes—rarely, however, by their complete disappearance, whatever time period is adopted. Unfortunately, microscopic deposits of cancer cells in impalpable glands in the substance of the hyo-glossus and genio-hyo-glossus muscles, and possibly even in lymphatic tributaries, are not directly influenced, and form foci for ultimate recurrence. Whenever it is a practical proposition the glandular field should, in my opinion, be attacked surgically, either by ordinary dissection or by block dissection, followed by the burial of screened radium tubes in the course of the lymphatic stream, and later on by surface radiation. It is essential not only to attack the main army but also to annihilate the outposts.

The primary lesion in the tongue may be treated by means of applicators, screened tubes, or unscreened tubes containing radium or its emanation. The use of applicators for any length of time is obviously impracticable owing to the difficulty of retaining them *in situ*, and is, therefore, a method which need not be seriously entertained.

Screened tubes may be buried in the growth and retained for periods varying with the extent of the lesion and strength of dosage. Owing to the screen absorbing all the alpha rays the therapeutic action is obtained from the beta and gamma radiations. The beta rays, however, being more local in their reaction than the gamma rays, are apt to produce necrosis, followed by sepsis, if retained for more than forty-eight hours, so that in practice it is advisable to cut off these rays by employing platinum-screened tubes with a thickness of 0.5 mm. containing 8 to 10 millicuries of emanation—equal to 8 to 10 mg. of radium element. The main objection to employing screened tubes in a mobile organ such as the tongue is that it is almost impossible to keep them accurately *in situ* for any length of time, and also on account of the risk of necrosis and painful sepsis. For this reason we have recently been implanting into the substance of the growth large numbers of "seeds" containing emanation, leaving them to become encapsuled or to slough out—the object aimed at being to devitalize the malignant cells and induce a state of fibrosis. These "seeds" or capillary tubes are from 3 to 6 mm. in length and from 1 to 2 mm. in thickness, and contain a dose of from 0.3 to 0.6 millicurie of emanation.

For effective therapy the lingual artery should invariably be ligated and the growth exposed so far as it is possible to do so, in order to permit of its being handled for the accurate implantation of the seeds in parallel series. The cutting off of the main blood supply frees the patient from the risks of haemorrhage and does not interfere with the therapeutic action of the emitted rays. It is also essential that the implantation of the seeds into the substance of the growth should follow a definite plan, parallel rows 1 cm. apart being inserted by means of a specially devised needle, those seeds implanted in the growth itself having a greater radio-activity than those inserted at its periphery.

The cases which in private practice come within the purview of the laryngologist are as a rule those cases of malignant disease which primarily attack the faucial, palatal, or buccal mucosa, and which later on spread to the tongue itself. In carcinoma of the larynx we differentiate cases as intrinsic and extrinsic—those which attack the interior of the laryngeal box and those which spread beyond its confines. In the former the prognosis is relatively good, owing largely to the late involvement of the lymphatic plexuses; in the latter, on the other hand, owing to the early involvement of lymphatic tracts, it is very bad. So in the tongue—in growths limited to the tongue (intrinsic cases)—early surgical removal of the affected whole or half of the organ, if carried right down to the hyoid bone, yields reasonably good results; if, on the other hand, tissues extrinsic to the tongue are involved, the prognosis is essentially grave whatever form of treatment is adopted. In such cases excision of the affected area with the diathermic cautery knife presents many advantages. In the first place, if the operation is done with deliberation there is little, if any, haemorrhage, the activity of the malignant cell is destroyed by coagulation, and owing to the sealing up of lymphatic tributaries the dissemination of the cancer cell is prevented. As a precautionary measure it is advisable to ligate the lingual or the external carotid artery. The current used should be from 1½ to 2 amperes, and should be increased from zero to full strength in about thirty seconds. When steaming takes place the current should be at once stopped, as at that moment the diathermic action ceases.

Another great advantage of diathermic excision is that it can be employed in the case of growths not readily accessible to ordinary cutting operations—for example, growths in the faucial region and posterior part of the tongue. The disadvantage of the method is that a slough forms and the mouth becomes very septic. The slough separates, however, as a rule within ten to twenty days, during which time the lymph vessels have become obliterated, so that distant septic infection is rare and dissemination of the cancer cell prevented. When excision is not possible, a useful method is destruction of the primary growth by button- or spike-shaped electrodes, the depth of tissue destroyed by each application being equal to the square of the surface of the applicator employed. Very extensive destruction of tissue is therefore possible with diathermic treatment. Healing is remarkably rapid and the resulting scar tissue soft and pliable. Should considerable deformity ensue, some plastic operation may be subsequently performed, or a mechanical appliance be worn.

Diathermic treatment in conjunction with radium is particularly valuable, screened or unscreened tubes being buried in the tissues. Where extensive ulceration is present, sepsis is largely eliminated as the result of sterilization of the tissues by the high frequency current and the risks of haemorrhage owing to an endarteritis obliterans following irradiation. My experience of these distressing cases leads me to state:

(1) That whenever possible immediate surgical removal of the primary growth and of the lymphatic field draining the focus of infection should be carried out.

(2) That when surgical intervention is deemed impracticable an attempt should be made to remove the growth with the diathermic knife or to destroy it by gradual coagulation with button- or spike-shaped electrodes.

(3) That when removal of the growth is contraindicated the insertion of unscreened radium tubes into its substance should be carried out.

(4) That combined treatment by means of diathermic coagulation and radium implantation affords at times gratifying results.

(5) That in early cases the lymphatic field upon the affected side should be dealt with surgically; in advanced cases the lymphatic field upon both sides.

(6) That irradiation of the lymphatic field should be an invariable post-operative procedure, preferably by the implantation of screened tubes, or alternately by surface applications or *x*-ray therapy.

(7) That no preliminary radiation should be employed if glandular deposits are to be removed by ordinary surgical procedures.

(8) That the diathermic cautery knife presents many advantages as compared with the scalpel for the removal of a cancerous tongue.

Through the courtesy of my colleagues Drs. Burrows and Birkett, I am able to place before you the results of the treatment of 812 cases of cancer of the tongue and mucous membrane of the mouth treated between January, 1915,

dissection of the neck should remove the whole of the gland-bearing fascia, both high up, far back, and low down. The best results seem to be gained by a block dissection starting from under the chin and extending backwards to the sterno-mastoid muscle, which must be removed in its greater part, together with the internal jugular vein. The dissection should extend back into the posterior triangles of the neck. Especially is it important to remove the glands high up under the parotid, a portion of which gland can also be removed. Better access can be obtained to this region by sawing off the angle of the jaw. The spinal accessory nerve has to be sacrificed in most cases, as it is surrounded by glands which cannot be separated from each other without the danger of the escape of their contents. No glands must be cut into, torn, or even squeezed, for fear of the escape of cancer cells.

This may seem an heroic procedure, and unnecessary in many cases, but only a careful examination later will show whether these glands have already become infected.

REFERENCE.
[1] BRITISH MEDICAL JOURNAL, 1925, vol. ii, p. 1223.

II.—SIR WILLIAM MILLIGAN, M.D.,
Consulting Aurist and Laryngologist to the Manchester Royal Infirmary and to the Manchester Ear Hospital; Surgeon-Laryngologist to the Manchester Radium Institution.

TREATMENT OF CARCINOMA OF THE TONGUE BY RADIO-DIATHERMY.

MY share in to-day's discussion will be limited to experiences gained in the treatment of carcinoma of the tongue by means of radium, diathermy, and a combination of both methods—namely, radio-diathermy.

Every surgeon will, I think, admit that the purely surgical treatment of cancer of the tongue leaves much to be desired, that the results are in general most disappointing. With radio-active treatment and with diathermy much the same tale has to be told, notwithstanding the fact that considerable relief to the more distressing symptoms is obtained and life prolonged in comparative comfort in many cases for somewhat surprisingly long periods as the result of the destruction of the primary growth.

To my mind the supreme factor in the successful treatment of cancer is time. Cancer when seen early is a local disease capable in many cases of eradication and cure; when seen late, as unfortunately it most frequently is, dissemination to adjoining lymphatic glands has already taken place and varying degrees of toxaemia are present. The cases referred to the radiologist are almost without exception those considered inoperable by the surgeon, and are therefore the worst type of material to work upon. Notwithstanding this fact, the insertion of radium in suitable doses, with or without the destruction of the primary growth by diathermy, affords at times complete freedom from symptoms often for years, and great comfort by relieving pain, by preventing haemorrhage, and by diminishing dysphagia.

For these reasons few cases are refused one or other form of treatment at the Manchester Radium Institute, even when the ultimate outlook is most unfavourable. "Hope springs eternal in the human breast," and experience has shown that a mitigation of the most distressing symptoms is of the greatest moment to the patient.

In almost all the tongue carcinomata dealt with the histological structure, as proved by microscopic section, is found to be that of a squamous-celled epithelioma—unfortunately the most resistant type of growth with which the radiologist is called upon to deal. Columnar-celled carcinomata are occasionally met with and prove somewhat more amenable to the influence of gamma radiations than the squamous-celled type.

The problems which have to be faced in the treatment of cancer of the tongue are:

1. Is operation a practical problem?
2. If it is, what is the best method of dealing with the primary growth?
3. Should the primary growth be removed prior to or subsequent to removal of the infected glands, or should growth and glands be removed at one and the same time?
4. Is it advisable or necessary to perform a preliminary ligation of the external carotid artery or of the lingual artery?
5. Has removal of the growth by the diathermy knife advantages as compared with ordinary surgical procedures?
6. Should insertion of radium into the growth be accompanied by radiation from the surface?
7. What are the advantages, if any, of combining radium and diathermy in the treatment of these cases?

Unfortunately many cases coming under review are obviously too advanced to permit of any reasonable possibility of successful surgical removal, partly from fixation of the tongue, from extension of the growth to adjacent areas of buccal, faucial, or tonsillar mucosa, and from the extensive lymphatic infection of one or both sides of the neck.

When surgical intervention is deemed admissible—and this undoubtedly varies with the mentality of the operator—it is, in my judgement, the proper course to adopt, and should be carried out on virgin soil as it were, without any previous irradiation, which, however serviceable as a post-operative procedure, only complicates successful surgical removal of the growth.

To effect an adequately free excision of certain tongue cancers with the knife is frequently impracticable, and it is just in such cases where the diathermy knife proves so useful, the tissues being slowly coagulated and a bloodless removal effected, bearing always in mind, however, that the occurrence of subsequent deformity must for the time being be ignored, the aim and object being to remove the growth in its entirety. Difficulties do not arise, however, so much with the removal of the primary growth as with the removal of the extensive secondary glandular deposits so frequently met with.

The lymphatic drainage from the tongue, largely submucous but partly intramuscular, runs in four well defined streams: (1) from the apex of the tongue, (2) from its sides, (3) from its median surface, and (4) from its base. The apical lymphatics drain into the submental and inferior cervical glands; those from its lateral surfaces into the submaxillary glands situated within and around the submaxillary salivary gland, and into the superior cervical and carotid glands; those from the median surface into the submaxillary glands; and those from its base into the superior deep cervical glands. It is also essential to note that lymphatic vessels cross the middle line of the tongue and drain into cervical glands on the side opposite to that on which the malignant growth or ulcer is situated. The problem of dealing efficiently with such a wide lymphatic field by ordinary surgical measures is thus a serious problem, at times so serious as to be impracticable. In such cases drenching the tissues with gamma radiations, either by the insertion of tubes or needles into the glands or by external radiation, opens up certain possibilities.

The insertion of suitably screened or unscreened tubes is undoubtedly more effective than external radiation. Where a sufficient quantity of radium is not at hand or obtainable, multiple puncture with a diathermy needle has at times proved serviceable.

Whether the primary growth should be treated first and glandular deposits second, or vice versa, is a moot point. My own preference is to attack the primary growth in the first instance, either by insertion of radium tubes screened or unscreened, or by means of diathermy button-shaped electrodes, or by excision with the diathermic cautery knife. I regard the glandular invasion as Nature's first defensive barrier, and consider that it acts as a filter bed of some importance during the period of temporary local disturbance which follows the removal or destruction of the primary growth. After the lapse of ten days or so a free dissection of the submaxillary and cervical triangles on the affected side should be undertaken, upon both sides if the disease is extensive. The radiation of the lymphatic tracts intervening between the primary growth and the secondary nodal deposits will depend upon the view held as to the method of dissemination of the cancer cell—whether it be the result of permeation or of embolic transmission. If the former view is held, the course of the lymphatic tributaries should be thoroughly irradiated, preferably by the insertion of tubes containing radium element or emanation along the course of their main channels or by external radiation from suitably disposed

operation. He thought the complication was due to discharges trickling down the throat. He believed that the glands should always be removed on both sides of the neck. On the second side, if no enlarged glands were felt, however, only the upper part needed dissection. He never performed bilateral block dissection at one operation as the patients always died. In order to gain access to the mouth in difficult cases he was accustomed to remove the alveolar part of the jaw; this was much better than splitting the mandible. In 30 to 40 per cent. of his cases there had been bone involvement, necessitating bone resections. He maintained that the presence of enlarged glands in the neck did not make the prognosis hopeless, since he could produce survivors in such cases up to five years and more. Although the primary mortality was very heavy, he did not take such a gloomy view of the outlook for these patients as many authorities, because he was able to establish a cure in about 50 per cent. of his survivors.

Mr. E. DEANESLY (Wolverhampton) said that the ultimate results of the purely surgical treatment of this disease were so discouraging that many surgeons would willingly hand them over to anyone who could cure them by any form of diathermy or radiation. Unfortunately, though it was not difficult to destroy the primary growth by such means, this was of little use unless the infected glands could also be destroyed or removed, and few radiologists claimed to be able to do this without a surgical operation on the neck. For the present, therefore, if the primary growth was surgically removable, from an anatomical point of view there seemed little advantage in diathermy, since the gland dissection was still necessary afterwards. But in certain situations where the growth involved the gums, the palate, or the tonsils, diathermy was the best means of dealing with it, the glands being removed by a subsequent block dissection. As regards the surgical treatment of removable cancer of the tongue he agreed entirely with Mr. Fitzwilliams, and had employed the same method for many years—namely, removal of the affected part of the tongue entirely through the mouth before any operation on the neck, the use of chloroform through a temporary laryngotomy with plugging of the pharynx, the exposure of the larger vessels before cutting them, and the complete covering of the raw surface with mucous membrane; this operation to be followed by block dissection of the neck, each side at a separate operation. He thought that operations involving the division or excision of parts of the mandible were rarely worth doing.

Mr. STANFORD CADE (London) said that in the surgery of cancer of the tongue and the treatment of cervical glands regional anaesthesia had proved a great advance. It diminished inhalation risks and gave perfect freedom in neck manipulation. The routine consisted in injecting a solution of 1/2 per cent. novocain near the lingual and inferior dental nerves and a cervical paravertebral block of the second, third, and fourth cervical nerves. By this method intrabuccal manipulations and dissection of the neck were accomplished painlessly. The unsatisfactory results of surgical treatment of lingual cancer led him to adopt the methods advocated by Professor Regaud in Paris and Professor Bayet in Brussels. He had substituted radium therapy for surgical removal in all cases of cancer of the tongue for the past two and a half years. Radium needles containing 0.6 mg. of the element and screened by 1/2 mm. of platinum were inserted around the growth in healthy tissue and left in position for five to seven days or even longer. Preliminary cleaning of the mouth was essential. A biopsy was performed in every case. Protection of the lower and upper jaws from radium necrosis was obtained either with lead or by subperiosteal resection. If the cervical glands were enlarged but operable a Crile's dissection was performed; if the glands were not enlarged, or if enlarged and inoperable, surface application of large doses of radium by means of Columbia paste collars, giving the requisite distance from the skin, were made use of. Results were highly encouraging and surpassed anything offered by surgery. This applied only to the disappearance of the primary growth; no claim whatsoever as to cure could be made at this early stage.

Mr. D. C. L. FITZWILLIAMS (London) referred to the workers at the Curie Institute; their results were about 25 per cent. of five-year cures. They had abandoned unscreened tubes as being dangerous for insertion. For glands it was recognized that block dissection gave better results than radium alone, and external applicators were very largely used. He was surprised at the bad results from operation reported by Mr. Gordon-Taylor; he agreed that the majority of deaths were from bronchopneumonia. He believed that this death rate would be reduced by withholding morphine, so as not to interfere with coughing, and by warming the anaesthetic. Sewing up the mucous membrane avoided the danger of a raw septic area, and the mortality would be modified above all by not using the diathermy knife. The speaker now only used the diathermy knife in those cases where sufficient margin could not be obtained by other means. Diathermy, though fashionable, was a retrograde step. Every thinking surgeon knew that the best instruments with which to divide tissues were the knife and scissors; no other method produced so little damage. Haemorrhage in the modern operation was negligible. He advised very strongly against performing block dissections of both sides. There was seldom any necessity for this unless the glands were obviously affected on both sides, when, in his opinion, operation held out little or no hope of prolonging life. Block dissection should be performed on the affected side and the other side should be left alone. If the patient was kept under supervision each month or two months, it would be seen at once if any affected glands appeared. The infection would be limited, as there was now no source from which malignant emboli could come. Infected glands could be easily and safely removed while small, provided they were not pinched, handled, or cut into, and ample time would be allowed to perform the second block dissection when it became necessary. Better results would be obtained by early diagnosis than by increasing the scope and range of operations.

Sir WILLIAM MILLIGAN, in reply, reminded the meeting that the cases of tongue carcinoma dealt with at the Manchester Radium Institute were cases deemed inoperable by ordinary surgical measures. He thought that there was ample room for an improvement even in the inoperable group of cases. No attempt was made to interfere with glands by any diathermic process; if the glands were operable, they were removed by ordinary surgical procedures. The radium technique was changed from time to time. He was not a slave to any one particular method, but it so happened in the table of statistics shown on the screen that 41 of the 51 more or less successful cases were treated with unscreened tubes. He was well aware that the pendulum had swung round to the employment of small doses in screened tubes for prolonged periods—a method which he also had employed for some considerable time past.

POST-OPERATIVE TREATMENT OF CANCER OF THE BREAST.

BY

H. W. CARSON, F.R.C.S.,

Surgeon, Prince of Wales's General Hospital, London.

CANCER of the breast is one of the few cancers that are becoming recognized at an earlier date; it is rare now to see the advanced cases which were common enough in the past. At the same time they are apparently increasing in frequency, and with the development of the knowledge of surgery in the profession it may often fall to the lot of a medical man to have to make himself responsible, if not for the actual operation, certainly for the post-operative treatment. It may be interesting therefore to mention a few practical points which may make the convalescence go more smoothly.

Uniformity of Operation.

The operation is becoming standardized. Adopting the permeation theory of Sampson Handley, it is generally agreed that the operation should consist of the removal of the whole breast with a minimal sacrifice of skin, and a wide removal (a circle 10 inches in diameter centred on

and December, 1925. The methods of treatment adopted were as follows:

Superficial applicators in	33 cases.
Screened tubes (24 hours or less) in	269 ,,
Screened tubes (24–48 hours) in	51 ,,
Unscreened tubes in	249 ,,
Unscreened tubes and diathermy in	61 ,,
Screened tubes and diathermy in	11 ,,
Screened and unscreened tubes in	67 ,,
Various combinations in	15 ,,

Out of the 812 cases treated, only 51 can be regarded as successful. These 51 cases have been well for the following periods:

For 9 years	1	For 3 years	8
,, 8 years	1	,, 2 years	5
,, 5 years	2	,, 1 year	16
,, 4 years	5	Under 1 year ...	13

The 51 cases were treated as follows:

By superficial applications alone	2
By screened tubes buried in the lesion	6
By screened tubes and diathermy	2
By unscreened tubes	21
By unscreened tubes and diathermy	7
By a combination of screened tubes, diathermy, and unscreened tubes	13

Unscreened tubes—in my opinion the method of the future—were therefore employed in 41 cases in which the primary lesion cleared up; of these 41 cases 35 have been well for over one year and 20 for two years or more.

Details of Cases in which the Primary Lesion has been apparently Cured.

	Site.	Treatment.	Metastases.	Section.	No. of Years Well.
1	Tonsil	(1) Screened. (2) Unscreened	O	O	9 6/12
2	Tonsil	Screened 24 hours, local and glands	+	O	9/12
			+	O	9/12
3	Soft palate ...	(1) Screened. (2) Unscreened	O	O	8 9/12
4	Cheek	Screened	O	O	3
5	Floor of mouth	Screened 24 hours	+	O	3 3/12
6	Cheek	Screened 12 hours. Unscreened	O	O	5 6/12
7	Tongue	Unscreened	O	O	2
8	Cheek	Unscreened	O	O	4 9/12
9	Floor of mouth	Unscreened	O	O	6/12
10	Tonsil	Unscreened	O	O	4 8/12
11	Fauces and tongue	Unscreened	O	O	9/12
12	Uvula	Unscreened	O	O	4
13	Fauces	Unscreened	O	+	1 6/12
14	Alveolus ...	Unscreened	O	+	5
15	Fauces	Unscreened	+	O	3 7/12
16	Tonsil	Unscreened	+	O	4 3/12
17	Tongue	Unscreened	O	O	3 7/12
18	Floor of mouth	Unscreened and screened	O	+	3 3/12
19	Cheek	Unscreened	O	+	3 3/12
20	Palate	Unscreened	+	+	3
21	Tongue ...	(1) Screened (2) Unscreened and diathermy	O	O	1 6/12
22	Tongue	Unscreened	O	O	1 3/12
23	Tongue	Unscreened	O	O	1 5/12
24	Tongue	Unscreened and diathermy	O	O	4
25	Cheek	Unscreened and diathermy	O	O	2 6/12
26	Floor of mouth	Diathermy and screened 24 hours	O	O	1 6/12
27	Cheek	Diathermy and unscreened	O	O	1 10/12
28	Tongue	Unscreened	O	O	2 2/12
29	Tongue	Unscreened and diathermy later	O	O	3
30	Fauces	Unscreened	O	+	2 6/12
31	Fauces	Unscreened and diathermy	O	+	1 3/12
32	Tongue	Unscreened and diathermy	+	+	2
33	Palate	Unscreened and diathermy	O	O	1 5/12
34	Fauces and tongue	(1) Unscreened and diathermy. (2) Screened 48 hours	O	+	1 3/12
35	Tongue	Unscreened	O	O	1 9/12
36	Fauces	Unscreened	O	O	1 4/12
37	Palate	Unscreened and diathermy	+later	O	1 5/12
38	Lip	Unscreened	O	O	1 10/12
39	Fauces	Unscreened	O	O	1 4/12
40	Floor of mouth	Unscreened	O	O	1 6/12
41	Tongue	Screened 48 hours and diathermy	+later	+	1
42	Tongue ...	(1) Screened 48 hours (2) Unscreened and diathermy	O	O	Under one year
43	Mouth	Plate	O	O	,,
44	Floor of mouth	Screened 48 hours and unscreened	+later	O	,,
45	Palate	Unscreened	O	O	,,
46	Tongue	Plate	O	O	,,
47	Floor of mouth	Unscreened	O	O	,,
48	Tongue	Screened 48 hours	+later	+	,,
49	Fauces and tongue	Screened 48 hours	+	O	,,
50	Floor of mouth	Unscreened	O	O	,,
51	Tongue	Screened 36 hours	+	O	,,

The accompanying table of results is taken from the annual report of the Manchester Radium Institute for 1925, and is compiled by the radiologist, Dr. G. E. Birkett, to whom I am much indebted for assistance in the preparation of these notes. The results can certainly not be considered brilliant, but with the type of case dealt with—surgically inoperable—they show at least that alternative methods hold out hopes of relief and periods of freedom from the most urgent symptoms of the disease.

Finally, Mr. President, an apology is perhaps due from me as a laryngologist for intruding into the holy of holies—that is to say, into a purely Surgical Section. I do so, however, at the invitation of your secretaries in order that I may place before you an unvarnished tale of the experiences gained at the Manchester Radium Institute and in my own private practice in the treatment of carcinoma of the tongue with radium, with diathermy, and with a combination of both methods.

No one, however impassionately reviewing the results of the treatment of cancer of the tongue by purely surgical measures or by one or other of the accessory forms of treatment, can remain satisfied with the results as at present; nor will the results, in my judgement at least, ever be good until the public realize the importance of applying for assistance at a much earlier stage of the disease than is usual to-day. This implies on the part of the public a knowledge of the importance of the early signs and symptoms of malignant disease, knowledge which can only be obtained if the profession lends itself to what in my opinion is so much needed in this country—namely, an anticancer crusade.

GENERAL DISCUSSION.

Mr. W. S. DICKIE (Middlesbrough) wished to confine himself to cancer of the postero-lateral part of the tongue. These growths were very often tumours of the fauces which had extended to the tongue. They very often spread outwards to the jaw and backwards to the tonsil or upwards to the soft palate. The jaw-bone dominated the whole operative procedure. He regarded temporary resection as useless, because the bone was very early involved. In operating upon these cases he first paid attention to the hygiene of the mouth, but did not remove teeth—mouth-washes and wiping alone being used. The anaesthetic was administered through a laryngotomy tube. He removed the jaw from the canine fossa backwards, including the condyle, and thus gained free access to the side of the pharynx. He did not perform a block dissection of the neck, although he cleared out all the glands and connective tissue, the sterno-mastoid being left. This part of the operation was done first and the jaw then removed subperiosteally. He thought it sufficient to leave half an inch margin of uninfected tissue around the growth. During the last five years he had operated upon 17 patients with 4 deaths; 8 of them had had no recurrence up to date. Two cases were exhibited.

Mr. G. GORDON-TAYLOR (London) said that carcinoma of the tongue was a disease of neglect of mouth hygiene and of syphilis; it was not a disease of the wealthier classes. He was accustomed to operating upon these cases in three stages: block dissection of the neck on one side, removal of the tongue, and block dissection of the neck on the other side. He had recently changed his technique, and had begun taking out the tongue first and doing a block dissection of the neck second. He had been led to do this because of the high mortality which accompanied an efficient operation. In 69 cases in which a mouth dissection had been performed with a diathermy knife, with a double block dissection in nearly every case, the mortality was 48 per cent. Against this very serious death rate he was able to show 50 per cent. of the survivors alive and well up to five and a half years. He found that 90 per cent. of the deaths were due to bronchopneumonia, and the risk of this occurring was greater after the mouth than after the neck operation. Laryngotomy facilitated the administration of the anaesthetic and diminished the incidence of bronchopneumonia, but did not prevent it. Patients who died from this cause succumbed on the third day after the

to the inner side of the arm. No incision need pass beyond the vessels along the inner side of which lay the glands of the axilla. He always made a plastic flap, which he used to fill in the gap left by the large amount of skin he took away. The easiest way of undermining the skin was, not to reflect it in the ordinary way, but to thrust a 6-inch amputating knife under the skin, and cut parallel with the skin. The flap could thus be cut with great rapidity and accuracy, especially in a fat patient.

Mr. GARNETT WRIGHT (Manchester) considered the kind of incision unimportant provided no scar was left in the axilla. He thought some skin should be taken away and that a continuous suture was far better than uninterrupted tension stitches, since it was less liable to cause necrosis. He regarded the position in which the arm was placed after operation as unimportant, but it should not be fixed. Active, not passive, movements were necessary, as they prevented adhesions of the scar to the chest wall.

Mr. G. GORDON-TAYLOR (London) said that he had made an extensive trial of post-operative *x*-ray treatment. He had found that the prognosis was rendered worse and had therefore abandoned it. Recently he had been performing the operation with the diathermy knife, a method which led to less loss of blood. He regarded the operation on the breast as always a very serious one. He had had two cases of traction palsy in carcinoma of the breast.

Mr. GEORGE SIMPSON (Liverpool) thought *x*-ray treatment after operation a very valuable addition. It was continued for six to twelve months, and he was very satisfied with the results.

DISLOCATION OF OUTER END OF CLAVICLE.

BY

A. B. MITCHELL, O.B.E., B.CH., F.R.C.S.I.,
Surgeon, Royal Victoria Hospital, Belfast.

THIS injury is not very common. The deformity is easily reduced but difficult to keep reduced. Partial recurrence always follows the ordinary method of treatment. I have never seen a patient who could play football after this dislocation unless an operation had been efficiently performed. In my early cases I only operated at a late stage for the relief of pain and prolonged incapacity. I wired the ends together; I invariably found it necessary to remove the wires, because they became loose or caused pain.

The operation I now employ is very simple and very efficient. I now recommend it in every case. Once it has been done the patient can discard all dressings in eight to ten days, and resume work in fourteen days. Two of my patients were playing Rugby football in two months. The procedure is as follows:

1. A curved incision with convexity behind is made from the tip of the acromion to the middle of the posterior border of the clavicle.

2. The flap thus outlined is reflected forward, exposing the acromio-clavicular joints.

3. The inter-articular cartilage is removed, and the ends of the clavicle and acromion process are freshened.

4. Two holes are drilled vertically through the end of the acromion, and also through the outer end of the clavicle.

5. A carefully sterilized strong silk ligature is passed through the clavicle, so that the free ends both project below and the loop is across the top. (Fig. 1.)

6. The free ends are then drawn through the acromion from below upwards. This is best done by the aid of a loop of fine wire. (Figs. 1 and 2.)

7. The ligature is now tightened and tied on the upper surface of the acromion. The effect of this is to pull the clavicle first downwards and then outwards, and to hold it firmly apposed to the acromion.

8. The periosteum around the edges of the new joint is sutured by fine chromicized catgut.

In my first case I used thirty-day catgut to hold the bones in position. I have discarded it in favour of silk on account of the greater tensile strength and durability of the latter.

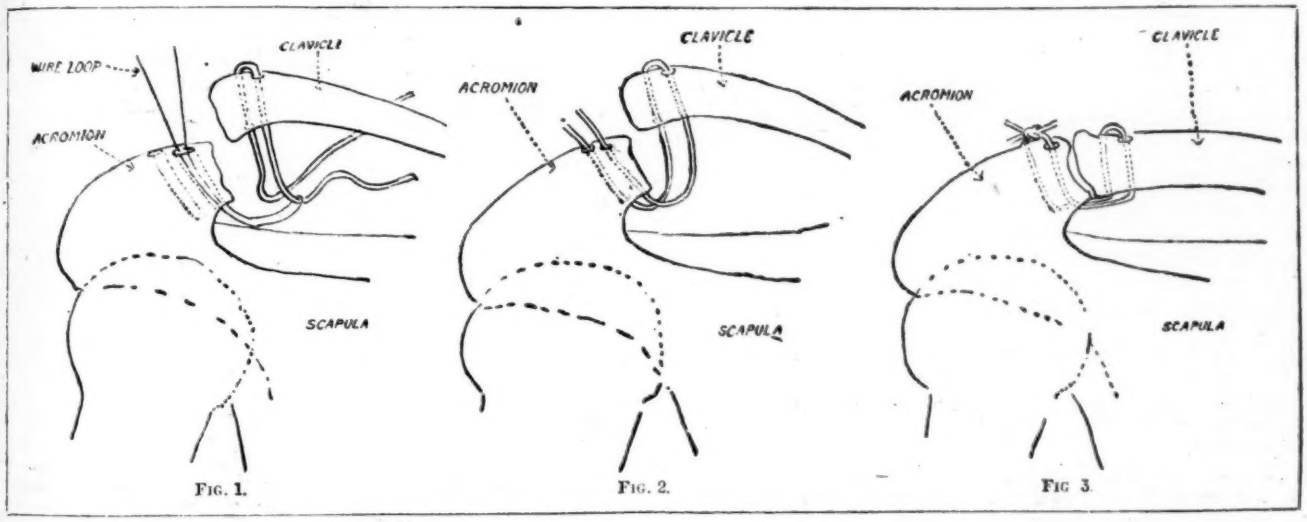

FIG. 1. FIG. 2. FIG 3.

SECTION OF OPHTHALMOLOGY.

WILLIAM GEORGE LAWS, F.R.C.S., President.

DISCUSSION ON THE SIGNIFICANCE OF RETINAL HAEMORRHAGES.

OPENING PAPER

BY

R. FOSTER MOORE, O.B.E., M.A., B.CH., F.R.C.S.,
Ophthalmic Surgeon, St. Bartholomew's Hospital; Surgeon, Royal London Ophthalmic Hospital.

THE subject which has been chosen for discussion at this meeting is that of retinal haemorrhages, and although it is a subject which has been widely discussed at various meetings and congresses I take it that it is the importance of the subject which has induced the Council to choose it, rather than the expectation that there is anything very fresh to say about it. At any rate, for myself I feel that there is little that I can say which has not previously been under discussion. I have, however, endeavoured to deal with known facts in a different manner.

I suppose we may assume that it is not intended to comprehend all those numerous diseased conditions of the retina with which retinal haemorrhages are associated, such as renal retinitis, retinitis circinata, etc., but rather that we should confine our attention to retinal haemorrhages as such. Cases of trauma or new growths need not be considered.

the growth) of deep fascia, including the sheath of the upper rectus abdominis on the affected side. The whole of the pectoralis major muscle, except its clavicular origin—even that in some cases—and the pectoralis minor are removed, and the axilla is dissected downwards from the costo-coracoid membrane, which is removed. The supra-clavicular fossa is not dissected as a routine.

There are certain points in the performance of the operation which help in the convalescence.

1. The removal of only the necessary amount of skin with the wide undercutting required to remove the deep fascia allows the incision to be sutured without tension in most cases. This has an important bearing on shock, pain, the healing of the wound, and chest complications.

2. The incision is designed so that the scar is kept out of the axilla. This is of importance for subsequent free movement.

3. The most minute care is taken to reduce loss of blood. Nearly all the bleeding comes from the anterior perforating arteries in removing the pectoralis major, and a capable assistant will pick up many of these vessels before they are cut.

4. Shock is minimized by protecting all raw areas which are not actually being worked on, by towels wrung out in hot saline solution.

5. Delicate quick work without tearing or rough handling reduces shock and promotes healing by first intention.

Immediate Post-operative Complications.

Shock is not often seen in these cases, but occurs sometimes three to four hours after return to bed. I always anticipate this possibility and institute the following treatment as a routine. Immediately after operation 1 pint of saline solution with 5 per cent. glucose is given by the rectum. This is repeated in four hours, and at the same time the patient is wrapped up in two blankets and placed under a cradle, to which is fastened an ordinary incandescent lamp. This lamp is kept alight for half an hour, then there is one hour's intermission, and it is turned on again for another half-hour. A hypodermic injection of morphine is given if the patient is restless or in pain, and is generally needed, though it is not often repeated.

Pain is not severe after the first night, and is excited later on only by the early dressings which inevitably lead to movements of the arm or body. All patients complain about the arm in whatever position it is placed.

Chest complications are rare, and are best avoided by careful preparation, especially of the upper air passages, by closing the wound without tension, and by avoiding tight bandaging. The patient is made to sit up in bed after the first twenty-four hours or less.

A few cases of paralysis of the upper arm have been recorded; I have had two in my own practice. The paralysis always affects the biceps, and is, I think, due to pressure on the outer cord of the brachial plexus, by excessive extension of the arm during the operation.

Position of the Patient.

The patient is supported by a wedge formation of pillows in a sitting position, and the elbow, forearm, and hand are carefully packed up with pillows. My practice is to keep the arm at right angles to the body from the first; it may be sufficient to support it on pillows, taking care to support the forearm and hand also, or it may be necessary to tie it to the head of the bed for the first few hours. I am convinced that the right-angled position is less painful, does not increase oozing, and makes the early attempts at mobility less difficult and painful.

Drainage.

Fluid appears in three areas: (1) in the axilla, (2) in the suprapectoral space, and (3) in the upper end of the rectus abdominis; the first and last collect blood, the second serum. Some surgeons drain the wound by four or five tubes introduced through stab wounds in the posterior flap. I do not consider this necessary, but I drain the axilla by a tube passed through a stab wound in the axilla flap, which I place as far back as I can, and I rely upon evacuation of the other collections by means of dressing forceps passed between the stitches of the main wound. I believe that the recognition and evacuation of these collections makes all the difference in the primary healing of the wound. This is by first intention as a rule. Occasionally necrosis of the edge of the axillary flap occurs, but rarely any other complication. The old idea that suppuration made recurrence less likely was very comforting, but there is very little evidence to support it. It is most important that the scar should not be allowed to become adherent to the chest wall, and it should be gently moved from the first.

Movements of the Arm.

The subsequent comfort of the patient and her value to the community depend much upon free mobility of the arm. Removal of the pectorals makes astonishingly little difference to the value of the arm, at any rate for ordinary pursuits, but limitation of shoulder movements is a real handicap, and is always associated with pain. My practice is to do the first dressing on the second day, and at each subsequent dressing passive movements, abduction, and forward and backward swinging movements are practised. Active shoulder movements are started at the end of the first week, but from the first the patient is allowed to flex and extend the elbow. At the end of the second week the patient should be able to raise her arm unaided to the side of her head. By this time she is allowed to get up. I am no advocate of early rising after this severe operation.

Swelling of the arm may occur as a later complication. I believe this to be due to pressure on the axillary vein by adhesions in the axilla, and that it is best prevented by strict asepsis and early movement. If it occurs it must be treated by massage and shoulder movements, but if it persists the axilla should be reopened and the vein freed. I have not had any lasting success with the Kondoleon or other operation.

Radiation.

It is difficult to obtain evidence for or against the routine use of x rays as a prophylactic against recurrence. I have had no personal experience of rapid or widespread recurrences which have been reported by some observers after the use of x rays, and I have had considerable experience of the value of radium and x rays in the treatment of recurrences. My own feeling is against its prophylactic use, but I will admit that I am ready and willing to be convinced of its value.

Keeping under Observation.

I make it a rule that all my patients shall attend for my inspection once a month for the first year, once in three months in the second year, and twice in the third year. Routine inspection in this way has allowed me to discover the occurrence of supraclavicular gland involvement in several cases before the patient was aware of it, and a timely operation is easy and curative. An x-ray examination of the mediastinum is also of value as an assurance of the absence of complications.

Summary.

In breast cancer operations success depends upon several factors:

1. The correct planning of the operation by the surgeon, so as to assure primary union and free movement after a thorough removal.

2. The skill of the surgeon's assistant in controlling haemorrhage and avoiding exposure during operation.

3. Skilful nursing to prevent shock and promote comfort.

4. Early movement to prevent fixation of the scar and limitation of shoulder movements.

5. Careful examination and re-examination at stated intervals for at least three years.

DISCUSSION.

Professor R. E. KELLY (Liverpool) recommended Kocher's incision for the removal of carcinoma of the breast and excision of a wider area of skin than Mr. Carson had depicted. He had found that recurrences, when they occurred locally, were not necessarily in the margins of the incision, but 1 to 1½ inches away from it.

Mr. D. C. L. FITZWILLIAMS (London) thought that no incision for removal of the breast need extend to the arm. The line of the vessels was from the middle of the clavicle

to see whether we can gather any guidance from this source as to the pathogenesis of the haemorrhages.

It will not be disputed that retinal haemorrhages are not all of one type, and there are a number which are characteristic in appearance, are easily differentiated, and to some extent are distinctive of different disorders. The following form eight types of haemorrhages which are distinctive in greater or less measure, and from certain of them we can, I believe, obtain some hint as to the mode of escape of blood from the vessels.

1. Flame-shaped haemorrhages.
2. Rosette haemorrhages.
3. Diamond-shaped haemorrhages with pale centres.
4. Gross haemorrhages of mottled appearance.
5. Pre-retinal or subhyaloid haemorrhages.
6. The haemorrhages of infective endocarditis.
7. The haemorrhages associated with subarachnoid haemorrhage.
8. Cotton-wool patches.

Let us consider these in order in a little detail.

1. *Flame-shaped Haemorrhages.*—These no doubt are the commonest type of haemorrhage. They may be exceedingly small, but are seldom very large. They are situated in the nerve fibre layer, and their appearance, like a tongue of flame, is due to their taking on the texture of this layer. They are a common type in renal retinitis, arterio-sclerosis, etc.

2. *Rosette Haemorrhages.*—These are small, are situated in the deeper retinal layers, and are somewhat characteristic of diabetes; they are almost always multiple, more or less circular, and have an irregularly crenate edge.

3. *Diamond-shaped Haemorrhages with a Pale Centre.*—These haemorrhages always remind me a little of the shape of an endothelial cell, the pale centre representing its nucleus. They are seldom large, are certainly seen much more frequently in the anaemias or leukaemias, and are rather distinctive of these conditions; they are quite rare in such conditions as renal disease and arterio-sclerosis. I suspect the pale centre is composed of those elements of the blood (perhaps fibrin and platelets) which last escape from the leak in the vessel before it is finally sealed. In rarer instances the pale centre is replaced by a denser red clot.

4. *Large Mottled Haemorrhages.*—These are gross haemorrhages composed of red areas mottled by white exudate. They usually occur close to the disc and along the temporal vessels, which in parts are completely hidden and in parts emerge for a short distance and disappear again. They occur chiefly in severe vascular disease and are probably due to a leak from a vessel larger than a capillary, although after their complete clearance, when the vessels in the affected area have again become clearly visible, I have sought for, but have failed to discover, any evidence as to the source of the leakage.

5. *Pre-retinal or Subhyaloid Haemorrhages.*—These form a very striking type of haemorrhage, and, as is well known, are most frequent in the macular region. They are of homogeneous texture, they may be multiple, and may show successive layers produced by successive bleedings. When very dense they often have a slaty appearance over their densest parts, and this appearance is also seen in other large haemorrhages of other types. They may occur in vascular disease, and leukaemia is a rather common cause of them. Erythropsia is sometimes complained of.

6. *The Haemorrhages of Infective Endocarditis.*—I suppose there can be no doubt that these are due to the lodgement of minute infected emboli in the retinal vessels, and it seems certain, for anatomical reasons, that they must be situated on the heart side of the capillaries. Few cases of the disease occur in which retinal haemorrhages are not present. It is more common in this disease than in any other to see the blood extending along the vessels as though it were effused into the perivascular sheath.

7. *The Haemorrhages Associated with Subarachnoid Haemorrhage.*—In any case in which there is free blood in the anterior cranial fossa it is free to flow into the loose subarachnoid sheath of the optic nerve. Thus it occurs in fractures involving this region of the skull, in cerebral haemorrhages which have afterwards extended into the subarachnoid space, and in rupture of aneurysms of the circle of Willis. Turnbull has shown that aneurysms of the circle of Willis occurred in 0.92 per cent. of the autopsies in which the head was examined at the London Hospital, and he and others have made it clear that with few exceptions they are due either to an inborn defect of the middle coats of the arteries or to infective endocarditis, and that syphilis enters very little into their causation. When haemorrhage into the sheath of the nerve takes place haemorrhages in the retina are not infrequently developed. They are large, adjacent to the disc, and usually multiple. It has been suggested that they are brought about by the direct extension of blood from within the sheath of the nerve along the central retinal vessels into the eye, but it is perhaps more probable that the presence of the blood in the sheath obstructs the outflow of the blood from the eye by pressure upon the central retinal vein, where it traverses the subarachnoid space and so is responsible for the haemorrhages. I think one may say that where retinal haemorrhages of this type occur in a patient who has had an apoplectic attack and in whom there are none of the ordinary signs of vascular disease spontaneous subarachnoid haemorrhage should be borne in mind and the cerebro-spinal fluid examined for blood. I have on four occasions diagnosed the condition, but in only one of them was the diagnosis put to the crucial test in the *post-mortem* room, and in this case it proved to be correct.

8. *Lastly, what I have called Cotton-wool Patches.*—Under this head I should like to make reference to certain patches which occur in the retina which I believe should be properly considered under the heading of haemorrhages—namely, white patches which are seen in the retina in some cases of anaemia. Seen by themselves they are indistinguishable ophthalmoscopically from the cotton-wool patches of renal retinitis. They are usually associated with haemorrhages, but may occur alone. Thus, in 43 cases of secondary anaemia in which retinal haemorrhages were present these white patches were present in 6, and in 2 of these cases no haemorrhages were present. They may be fringed by blood or form a sort of fringe for a haemorrhage, and indeed every gradation between a pure red haemorrhage and a pure white patch may occur. Their especial importance is that when they are associated with haemorrhages, or indeed apart from them, the condition may simulate early renal retinitis so closely as to be indistinguishable from it, and one should remember that severe anaemia is a frequent concomitant of nephritis, and perhaps may be a factor in the production of the ophthalmoscopic changes of this disease. I imagine the patches are produced by infiltration of the retina by fibrin.

SECTION III.

In the light of the information that we have reviewed in the two previous sections may we now see whether we seem justified in forming any conclusions as to what is the route by which the blood escapes into the tissues and what are the immediate pathological processes which lead to this escape.

Does it occur from arterioles, or capillaries, or venules? does the escape occur by a process of diapedesis or by a gross lesion? is it the result, for instance, of the giving way of small aneurysms, or is there a rupture of a vessel wall? is the escape due to a disease of the vessel wall, or to an altered state of the blood acting on a healthy vessel wall, or are mechanical causes alone sufficient even though the blood and vessels are healthy? It would seem evident that the immediate cause of the escape from the vessels in such divergent conditions as thrombosis of a retinal vein, pernicious anaemia, or a case of infective endocarditis must be very different.

Let us first consider the site of the escape of the blood. May it occur from arterioles? Rupture of the small arteries in the brain is common, is frequently associated with multiple aneurysmal dilatations, and is caused by the giving way of such a dilatation; but what aneurysms have been reported on the retinal arteries have, I think, always been associated with other retinal changes and have probably been of congenital origin; and in the many cases of arterio-sclerosis which I have seen associated with cerebral haemorrhages I do not remember to have seen an aneurysmal dilatation of the retinal arteries.

I should like to state here that it was chiefly the stimulus supplied by reading Dale and Laidlaw's and Dale and Richards's investigations, and Krogh's work on the anatomy and physiology of the capillaries, that induced me to accept our secretary's invitation to take part in this discussion, and I may appropriately here acknowledge my special indebtedness to these investigators.

I propose to deal with the matter under the following sections: I, General considerations. II, The different types of retinal haemorrhages. III, A consideration as to the pathogenesis of the haemorrhages. IV, The changes which retinal haemorrhages undergo.

SECTION I.

I put forward the following as a reasonable classification of retinal haemorrhages, excluding such as are due to disease localized in the eye.

A. *Disorders of Metabolism.*
1. Renal disease.
2. Diabetes.
3. Scurvy.

B. *Diseases of the Haematopoietic System.*
1. Arterio-sclerosis.
2. Severe anaemias (or severe cachexia).
3. Leukaemias.
4. Infective endocarditis.
5. Vaquez's disease.
6. Haemophilia.

C. *Obstruction to the Venous Flow.*
1. Thrombosis of the retinal veins.
2. Thrombosis of the cavernous sinus.
3. Subarachnoid haemorrhage.
4. Papilloedema.
5. During birth.
6. Severe compression of the chest.

Let us now consider for a moment the structure of the small vessels as shown by Krogh. The capillaries are, of course, the essential part of the circulatory system; the whole of the rest of this system, whether heart, arteries, or veins, being solely concerned with ensuring that an appropriate supply of blood is delivered to the tissues through the intermediation of the capillaries. Krogh has shown that the capillaries are not tubes which undergo passive dilatation or narrowing, but that actively contractile cells (Rouget cells), which are under nervous control, are incorporated in their walls outside the endothelium, forming a loose meshwork, through the spaces of which free transition between the blood in the capillaries and the fluid in the tissue spaces takes place. By means of these cells the capillaries are capable of extreme constriction or dilatation.

He has shown that in a resting tissue at any one moment a few only of the capillaries are transmitting blood, the remainder being collapsed and empty, but that capillaries which are open at one moment are shortly closed down and neighbouring ones which previously were contracted have now become patent; and this process is repeated again and again, so that all the tissues are adequately supplied. He has shown that in an active tissue all the capillaries transmit blood, and that the number of such capillaries in an active tissue as compared with a resting one may be increased twenty or thirty fold. (Whether it might be possible to find evidence of this phenomenon in the retina by varying the illumination I do not know, but it would certainly be worth trying.) He has shown, too, that in certain circumstances the capillaries may transmit plasma without any contained red cells—a condition to which he applies the term of "plasma-skimming."

So far, then, as the capillaries are concerned we have to deal with vessels composed of one layer of endothelial cells, outside which is a wide-meshed network of contractile cells leaving a large part of the endothelial wall uncovered; so that under nervous control the capillaries may be quite collapsed, they may transmit plasma only, they may be so narrow that a red blood corpuscle is squeezed into a sausage-like shape in passing through, or they may be so greatly dilated that they are several times the diameter of the supplying arteriole. The transition between arterioles with a complete muscular coat and capillaries is sharp and abrupt; on the other hand, the transition between capillaries and venules is more gradual, for the latter have at first, like the capillaries, an outer coat formed of a wide-meshed network of Rouget cells, through the meshes of which interchange between the blood and tissue fluids can occur as in the capillaries.

In conditions of health there is a very free interchange of fluids, salts, gases, proteins, and even colloids, between the capillaries and the tissue spaces; and this interchange may take place in either direction, for after a large haemorrhage not only is the volume of the blood quickly made good, but the constitution of the plasma is rapidly restored by the transference of the appropriate constituents from the tissues; but in spite of this very complete interchange there is no passage of the cells of the blood into the tissue spaces, and Krogh has shown by the following striking experiment how impervious is the healthy capillary wall to the transmission of minute foreign particles.

Particles of Indian ink are submicroscopic, nevertheless when the capillaries are widely dilated as a result of treatment by histamine, if so much Indian ink is injected into the blood that the plasma, even in the smallest vessels, is made quite grey, even though the plasma passes out very freely through the endothelium into the tissues the minute Indian ink particles are kept back quantitatively within the capillaries. If, then, escape of blood occurs from the capillaries, there must be some special factor or factors which are responsible for its escape.

Ricker and Regendanz performed two experiments on the conjunctiva of rabbits, in one of which the conjunctiva was severely irritated by a mechanical stimulus—namely, finely powdered pumice-stone, which was then washed out. There was immediate strong hyperaemia, and in a few minutes complete stasis, but haemorrhages are not mentioned. In the second experiment a solution of abrine was dropped into the conjunctival sac. There was no immediate effect, but eight hours later there was pronounced hyperaemia, and next day the vessels were much dilated. There was marked capillary stasis and capillary haemorrhages, which increased for several days. Here, then, the haemorrhages seemed to be due to poisoning of the endothelial cells by the abrine; and it is well known that in what one may refer to somewhat roughly as poisoned states of the blood, such as diabetes and renal disease (to mention perhaps the two most prominent), retinal haemorrhages are of frequent occurrence.

Thus it seems evident that there are certain poisons which especially affect capillary walls, so that they no longer maintain an inviolate barrier against the passage of cells from within their lumen; and I suppose it cannot be doubted that toxins may be responsible for retinal haemorrhages, whether it be by means of a gross breach, so to speak, of the capillary wall, or whether by diapedesis between adjoining endothelial cells. I suspect that it is defective nutrition of the endothelium which determines the escape of the blood, and this I suggest is brought about by abnormal constituents in the blood, as in nephritis or diabetes, or perhaps in the anaemias by the defective nature of the blood itself.

There is a structural abnormality in the vessels which may be mentioned. Aneurysms of arteries and veins which are visible to ophthalmoscopic examination have often been described and are well recognized; aneurysmal dilatations of the capillaries are figured by Gowers in the second edition of his *Medical Ophthalmoscopy*, and Parrisius[1] states that in individuals who are the subject of vaso-neurotic constitutions—that is, patients in whom frequent changes in the innervation of small vessels occur spontaneously, or from trivial causes, as, for example, those in whom the fingers go quite white or "dead," as they say (due to simultaneous contraction of arteries, capillaries, and veins), sometimes strongly red (dilatation of all vessels), or deep blue (contraction of arterioles with dilatation of capillaries and venules)—that in such individuals at the same moment there may occur, in capillaries lying side by side, some of usual calibre, some enormously dilated, and in some true capillary aneurysms.

SECTION II.

Different Types of Retinal Haemorrhages.

Having considered some of the features concerning the normal capillaries it would seem best, in the next place, to consider haemorrhages as seen with the ophthalmoscope,

small haemorrhages looking like leaves on a tree, the branches of which were represented by the veins and their smaller tributaries. It seemed impossible to avoid the conclusion that there was some venous obstruction which was of sufficient degree to cause the haemorrhages; and in one case thrombosis of the central vein had occurred in the right eye, and one could not but feel, from the presence of the appearances described above, that it was imminent in the left. Nevertheless the haemorrhages completely disappeared, and ten years later none were present and the eye was still good enough to enable the man to continue his work at a paper-cutting machine, even though it was his only useful eye. Abnormal dilated vessels had formed on the disc, which, it seemed, had provided collateral channels which were sufficient to relieve the obstructed venous outflow.

It would seem, then, that leakage of blood from the arterioles occurs from the lodgement of infected emboli, as in infective endocarditis, from the capillaries, either from poisoning of the endothelium as in renal disease or from impairment of its nutrition as in the anaemias, and from the venules from mechanical causes, as in a hindered venous outlet from the eye.

SECTION IV.

On the Changes which take place in Retinal Haemorrhages.

It is worth while giving some attention to the ophthalmoscopic changes which take place in retinal haemorrhages in the course of their disappearance, and to inquire whether any permanent residue of them remains and whether permanent sight defects occur. It has been shown by a number of observers, and recently by a careful investigation carried out by Juler, that retinal haemorrhages are very common in newborn infants and are apparently produced during the process of birth. Juler found them in 15.5 per cent., and, contrary to what might have been anticipated, he was not able to substantiate that they were most frequent in difficult and prolonged labour. Seeing, then, that 15.5 per cent. of the population have retinal haemorrhages at birth, it is quite evident that in a very small proportion of them, if any, a permanent residue of the haemorrhages persists, or damage to sight is produced.

I have on many occasions carried out observations on all sorts of retinal haemorrhages by making outline drawings, using the retinal vessels as lines of latitude and longitude so to speak, so as to be able to identify exactly the particular haemorrhage which was being watched.

I believe it may be said that all haemorrhages simply fade away, gradually becoming smaller, and undergoing no other change in colour. The length of time required for their complete disappearance varies enormously. Thus, I have seen a small flame-shaped haemorrhage disappear completely in six days, and Mr. Juler tells me that he has seen a haemorrhage in a newborn infant disappear completely in so short a time as four days; this observation has the advantage that the precise time of the development of the haemorrhage is known, whereas in my own observations the time of disappearance has necessarily been taken from the date of discovery of the haemorrhage.

On the other hand, large dense haemorrhages may take many months for their complete absorption. I have notes of large heterogeneous haemorrhages which took more than a year for their complete clearing.[3] In the case of thrombosis of the central retinal vein, where haemorrhages are especially profuse, I have on several occasions seen the retina afterwards become completely free of haemorrhages, though it is much more usual for a few haemorrhages to remain for months or years if they are carefully sought for; it is not, of course, that the same haemorrhages remain for all this period, but fresh ones are developed as the old ones become absorbed. I have seen a case of central vein thrombosis where the haemorrhages cleared completely and eight years afterwards recurred, the fundus having exactly the appearance of a primary thrombosis of the central vein. I have once seen, in a man of 77, what looked like small globules of blood in the retina, which were still present and hardly changed in appearance three years later; and on two occasions I have seen blood in connexion with the perilental space which I believe had been present for six years. It seems very improbable that blood should remain for so long a period, but without being certain I believe my observation is correct.

We may now inquire as to whether permanent fundus changes may develop as a result of a retinal haemorrhage. I believe it may be stated that haemorrhages, no matter how profuse or large, produce no permanent change in the retina unless the external limiting membrane is lacerated. Unless this occurs no sort of pigmentary change follows, the haemorrhage clears so completely that no residue remains, and the part of the fundus previously involved comes to have a normal appearance, except that where the haemorrhage has been large I have several times seen a few bright dots scattered over the area. Juler's observations supply additional evidence in this direction, for, as already stated, he finds that 15.5 per cent. of the population have haemorrhages in the retina at birth, and it is certain that no such proportion of the general population have abnormal pigmentary fundus changes. I have shown that in cases of thrombosis of the central vein pigmentary changes at the yellow spot are afterwards rather common, but I have little doubt that they are of degenerative origin, and not a residue from the blood, for the changes are limited to the macular area, and I have never seen them in cases of tributary thrombosis; and, further, Williamson-Noble's observations[4] provide definite histological evidence in favour of this view.

With regard to the cotton-wool patches to which I have drawn attention, they, like the haemorrhages, gradually fade away completely and leave no permanent residue; they disappear, however, more rapidly than haemorrhages of similar size, and where they are developed in association with blood, as, for instance, where they form a sort of fringe for a haemorrhage, they disappear long before the haemorrhage has become completely absorbed.

REFERENCES.

[1] *Deut. Zeit. f. Nervenheilk.*, 1921, lxxii, 310. [2] *Trans. Ophthalmol. Soc.*, 1916, xxxvi, 319. [3] *Quart. Journ. Med.*, 1917, x, 29; and *Brit. Journ. Ophthalmol.*, Supplement, 1924. [4] *Trans. Ophthalmol. Soc. U.K.*, 1923, xliii, 287.

GENERAL DISCUSSION.

Dr. C. O. HAWTHORNE (London) emphasized the medical importance of retinal haemorrhages. As such haemorrhages might occur without any recognition by the patient of impaired vision, and as they might be the earliest objective evidence of serious disease, it necessarily followed (1) that every patient should be examined by the ophthalmoscope, and (2) that any patient who was the victim of a retinal haemorrhage should be subjected to a complete clinical examination. No practitioner supervising an acute or prolonged illness was content with a single examination of the heart or the urine, and similarly no practitioner should in like circumstances be content with a single ophthalmoscopic examination. Though no retinal haemorrhages were present on one day it did not follow that they would not be present on the next. An explanation of a retinal haemorrhage in a patient who in other respects was organically sound was not easy. It might be suggested that there were persons with unduly brittle retinal vessels, even as there were persons whose cutaneous vessels yielded to such slight pressure as a friendly grip, with the resulting production of a bruise. Just as certain abnormal qualities of the blood led in different instances to such events as petechiae, ecchymoses, epistaxis, haematemesis, haematuria, etc., it was at least possible that other alterations in blood quality, too subtle perhaps for detection at present, prejudicially affected the integrity of the retinal vessels and thus caused retinal haemorrhages. In any event it was beyond dispute that now and again such haemorrhages occurred apart from appreciable evidence of disease even when the patient's subsequent history was followed over a relatively long course of years. Examples of the clinical value of the recognition of retinal haemorrhage were to be found in glycosuria and nephritis and arterial degeneration; and particularly in difficult cases such as pyrexia without obvious cause, for while in pernicious anaemia and leucocythaemia retinal haemorrhages were the rule, they were not to be expected

In the cases of sudden infiltration of the vitreous by blood leading to sudden great loss of sight it is, I think, clear that a vessel of larger calibre than a capillary has given way, but whether this has been on the venous or arterial side I have no direct evidence to offer, although on several occasions I have looked for the source of the bleeding when, the haemorrhages having cleared, the retina has again become to some extent visible. I should think it is indisputable that in infective endocarditis and other cases of septicaemia and pyaemia, where the haemorrhages are brought about by the lodgement of emboli, such haemorrhages occur from arterioles.

We may next give consideration to the capillaries as the source of leakage. We have already seen in Section I that the very essence of capillaries is that they should allow of the freest possible interchange between the blood and the tissue fluids, and at the same time we have seen how impermeable they are to foreign or abnormal constituents so long as their nutrition is maintained.

It seems to me that the picture that is presented to our mind is that of an endothelial cell or cells whose health is impaired by the action of a toxin, to the extent that the endothelial tube is no longer inviolate, but that a defect in it is developed which is sufficiently gross to allow of the escape of the cellular elements of the blood into the tissues; whether such a stoma results from the opening up of the line of junction of separate cells or from a breakdown in the cell itself I should not care to guess. We may remember that red cells are easily distorted, so that they pass through capillaries of much less diameter than themselves, and that they will pass through filter paper which keeps back granules quantitatively much smaller than they are, even though the pressure is no more than the height of the fluid in a funnel, and it may be that this faculty facilitates their escape from within the lumen of the capillary.

I believe, then, that circulating toxins, by acting on the endothelial walls of the capillaries, render their walls permeable to blood cells, and that there are certain toxins which seem to have a specific action in this direction, whereas many others which similarly have a specific action on other tissues have none such on the capillary walls. Thus, to take a single example only, the diphtheric toxin, while potent for heart muscle, does not, except in special cases, lead to haemorrhages in the tissues; on the other hand, the toxins of certain other organisms appear specially to lead to haemorrhages, and perhaps the Koch-Weeks bacillus in the conjunctiva is a fair example of this.

I suggest, then, that the retinal haemorrhages of renal disease and diabetes are probably due to this cause. In the case of the anaemias, leukaemia, and cachexia, I see no reason to suppose that there is necessarily any circulating toxin which causes the haemorrhages, and it seems to me that the likeliest cause is a defect in the nutrition of the endothelium as a result of the depleted quality of the blood or perhaps from defective oxygenation.

Haemorrhages in the Anaemias.

It may be said in a general way that in any severe anaemia retinal haemorrhages are likely to occur, and especially is this so when the anaemia is the result of a prolonged drain on the body, such as the anaemia which is a part of a severe cachexia from any cause. I doubt whether a patient ever dies of pernicious anaemia or leukaemia without at some time having haemorrhages in the retina. On the other hand, although chlorosis has now become a rare disease I never remember to have seen a retinal haemorrhage in the condition, and I have seen extreme anaemia rapidly produced by loss of blood without haemorrhages occurring in the retina.

We may now inquire whether increased pressure in the capillaries may be responsible for haemorrhages.

It is, of course, well recognized that folk with a high systolic pressure—for example, in renal disease or primary arterio-sclerosis—frequently have retinal haemorrhages, and it is sometimes assumed that it is the increased pressure in the vessels which is directly responsible for the haemorrhages. I believe that the peripheral resistance to the circulation which is responsible for the increase in the blood pressure is situated in the small arteries, and that the pressure in the capillaries of such patients is not at all raised, but is frequently, and perhaps always, less than the normal—a fact which I believe is demonstrable, as I have pointed out elsewhere.[2] Any drastic reduction in the general blood pressure of such patients, were it in fact possible to bring it about, would only still further reduce the blood supply to the tissues, so that their functions could no longer be efficiently carried out, and the patient's well-being would be still further prejudiced; and indeed I would not be surprised to find that any drastic lowering of the blood pressure of such patients would lead to an increase in retinal haemorrhages.

I do not believe, then, that retinal haemorrhages of arterio-sclerosis are caused by an increase of pressure in the arteries or capillaries; they occur only in cases which are somewhat advanced, and I suggest that the haemorrhage is an expression of the defective circulation through the vessels, so that the nutrition of their endothelium is impaired and consequently a leakage of blood occurs.

If we now turn to the other side of the capillary bed—namely, the veins and venules—Krogh has shown that the small venules are supported by an open meshwork of Rouget cells, and are not completely clothed by a muscle coat, so that they probably act as capillaries for the interchange of substances between the blood and the tissue spaces—a fact which would seem to facilitate leakage from them.

There are a number of conditions where the venous flow from the retina is obstructed in which retinal haemorrhages occur; they form perhaps the most interesting of the cases with which we are concerned, and may be conveniently classified in three groups:

GROUP A. *Cases of general venous engorgement.*
1. General constitutional conditions, such as whooping-cough or vomiting.
2. The haemorrhages produced apparently by the process of birth.
3. Severe compression of the chest.

GROUP B. *Due to a local cause outside the eyeball.*
1. Subarachnoid haemorrhage.
2. Papilloedema.
3. Some cases of thrombosis of the cavernous sinus.

GROUP C. *Due to a cause within the eyeball.*
Obstruction of the central retinal vein or one of its tributaries.

It seems difficult or impossible to avoid the conclusion in all these cases that the back pressure caused by the venous obstruction is the cause of the leakage of blood.

In Group A there is venous engorgement of the whole body, and I think it may be said in a general sort of way that the profusion of the haemorrhages is commensurate with the degree of the engorgement.

In Group B the site of the obstruction in papilloedema and subarachnoid haemorrhages is probably in the central retinal vein where it crosses the subarachnoid sheath of the optic nerve. In thrombosis of the cavernous sinus haemorrhages are inconstant and their incidence may depend upon the anatomical termination of the central retinal vein; if it enters directly into the sinus haemorrhages would be likely to be profuse, but where it ends in the ophthalmic veins the occurrence of haemorrhages may be avoided when the communication between this vein and the angular vein is a free one.

In Group C the obstruction is in the veins of the retina in which thrombosis may occur, or the lumen may be reduced by endophlebitis, or the vein may be pressed upon by a thickened artery.

It is true that in these cases the small vessels may be diseased and add an additional factor, but in the case of birth haemorrhages, the haemorrhages of papilloedema, and those associated with subarachnoid haemorrhages, there is no associated vascular disease, and there can be no doubt that the extreme venous engorgement is transmitted to the venules and capillaries, and so perhaps they are distended to the point of bursting or leakage.

In this connexion I should like to refer to cases, of which I have seen several instances, where there was evidently a hindered outlet of blood from the eye owing to disease of the veins but no complete obstruction, associated with innumerable small retinal haemorrhages in the territory of one tributary or of the whole retinal vein, the

issue in twelve months. Large haemorrhages in young persons might have a tuberculous basis, and clear up under the appropriate specific treatment.

Mr. E. H. HARRIES-JONES (Northampton) said that in any discussion of prognosis in retinal haemorrhages they must not forget that quite a number of patients developed acute glaucoma.

Dr. E. J. PRIMROSE (Glasgow) mentioned the case of a patient who, at the age of about 38 years, had an extremely profuse infiltration of her right eye, with minute haemorrhages. A few years previously she had had an acute iridocyclitis of the left eye, while the system generally was affected with rheumatism, and there was also a positive Wassermann reaction due to inherited syphilis. These constitutional conditions and the local eye condition were entirely in abeyance, and had been so for some years, when the retinal haemorrhages occurred in the other eye. The Wassermann reaction had been, and continued to be, negative. The retinal haemorrhagic condition was treated without resort to antisyphilitic or antirheumatic remedies, and it completely cleared up, so that from almost blindness she had a vision of 6/6, and ophthalmoscopically no vestige of the retinal haemorrhages could be discovered. Several years had elapsed since then, and though she still had pains in the eye that had had irido-cyclitis, and at these times suffered from rheumatic pains in the joints, the eye that had had the retinal haemorrhages continued to function well and was free from sign or symptom. He did not think albuminuria had been present.

Dr. A. VERREY (Lausanne) always feared retinal haemorrhages, and thought their prognosis was bad in the majority of cases. He insisted on the importance of remembering the possibility of haemorrhagic glaucoma occurring, and referred to the way in which haemorrhagic states of the retina often resulted in increase of tension.

HIGHER EDUCATION OF GIRLS WITH LITTLE OR NO SIGHT: CHORLEY WOOD COLLEGE.

BY

N. BISHOP HARMAN, M.A., M.B.CANTAB., F.R.C.S.ENG.,
Senior Ophthalmic Surgeon to the West London Hospital.

HALF a dozen years ago the greatest lack in the arrangements in this country for the training of blind children was made good by the establishment of Chorley Wood College by the National Institute for the Blind, and it is fitting that some account should be given of the new venture. There was before that date ample provision for the training of blind children in levels of work corresponding to elementary education; for training in handicrafts in schools and institutions of more advanced type which might be graded with secondary schools; and there were voluntary institutions which specialized in certain arts, such as music. But the provision for higher education was deficient; there was a first-class public school for boys in Worcester College, but there was no corresponding public school for girls. That deficiency was a serious disadvantage to blind girls, particularly of our station of life. The numbers of such girls are happily few, but there are enough to make proper provision for their effective training and education a necessity; the more especially as the blind girl is handicapped in the highest degree; for her the richest field of womanly activity is closed, since motherhood and the care of a home is wellnigh debarred her. It is the more necessary, therefore, that the individual capacities of these girls should receive the highest form of cultivation possible along other lines, so that they may find the joy of life in other forms of service. Before 1921 the only form of blind training available for them was through individual tuition by home teachers of the blind. A very few, despite their handicap, made good in the ordinary roads of education in association with the sighted. But for the most part the education these blind girls of our class received was little more than learning to read and write Braille.

Attention was called to the need of a school for blind girls in the report of the Interdepartmental Committee on the Welfare of the Blind in 1917, but the stress of war prevented anything being attempted. In January, 1921, the National Institute for the Blind opened a splendid college for girls "with little or no sight" at Chorley Wood in Hertfordshire. I call it a splendid college, and indeed it is. The grounds and buildings will stand comparison in dignity and impressiveness with any modern public school that I know. The mansion which is now the college was built some sixty years ago in the Palladian or domestic classical style. It is a fine specimen of building in good stone and brick, with noble porticoes and windows, great sweeps of lawn, and many quiet pleasaunces, and placed in a position of surprising beauty on the edge of Chorley Wood Common. This common is a high table-land, rugged with gorse and bracken, with a view of tree-crowned heights in the distance beyond the moat-like valleys that protect the common from popular invasion. Judged by our modern English feeling for and reversion to the Tudor cottage style of domestic architecture, noble as this mansion is, it must have been for a private home uncomfortably spacious. A family, even with a generous allowance of guests, must have been lost in it, and perhaps have yearned for some little suite like that of Marie Antoinette buried in the heart of vast Versailles. But as a college it is perfect. Spacious and airy halls, broad shallow-stepped stairs, straight level corridors, a solidity of structure that damps out the noise of internal traffic, and a complete absence of extraneous sounds save the distant calls of birds and cattle. All these features combine to provide that calmness of atmosphere which is true mate to the cultivation of the mind; whilst the spacious rooms, with their admirable lighting, give a brightness that is most attractive to those girls who still possess some little sight. The estate and house was the generous gift of Mr. J. H. Batty; the house has since been remodelled at great cost by the National Institute for the Blind, so that it is now in every way fitted for a college. The interest shown in the college may be gauged by the growing list of benefactors, headed by the King and Queen.

The college receives girls from the age of 7 years and upwards. On occasions a few young adult women have been received into residence for special coaching for university examinations and the like. Pupils have come from all parts of the British Isles, and a few from abroad—for instance, Sweden, Holland, Italy, and South Africa. Terms and holidays conform to the usual public school arrangements. The school work-rooms, dormitories, the food, the care of clothing, and the sanitary arrangements are excellent. On one of my visits there accompanied me a lady of wide experience; she was greatly impressed with the excellence of the domestic side. An ophthalmic surgeon visits the college at the beginning of each term and examines each pupil; the local medical practitioner is the school doctor, and visits regularly; the matron is a trained hospital nurse. Detailed medical records are kept.

The educational staff comprises the headmistress, four full-time, one half-time, and four visiting teachers, all with degrees or their equivalents. The headmistress is Miss Phyllis Monks, M.A., of Girton College, Cambridge, and formerly a mistress of Roedene School and Fulham County Secondary School. So that both by training and experience she is exceptionally qualified to guide pupils who are less standardized than the average public school girl. In an inspection by the Board of Education in 1925 note was made of the generous allowance of staff, but it was added, "it has to be remembered that there are special difficulties in teaching the blind, which are best surmounted when classes are small." The curriculum is of full public school standard, including Scripture, English, geography, history, French, Latin, mathematics, science (of which there is some practical work despite the difficulty thereof), handwork, music (of which much is made), and physical instruction. Braille and typewriting are inevitable; and there are such pleasant tasks as poultry keeping, gardening, domestic crafts, housewifery, raffia and cane work, needlework, spinning, weaving, and the making of pottery. That the level of blind education is able to keep closely to normal standard is due largely to the ever-increasing library of Braille books now available to students. Special boards and type bring all arithmetic

in enteric fever, paratyphoid fever, or in tuberculosis. Again, joint pains, apt to be labelled "rheumatism," took on a different aspect when the presence of retinal haemorrhages suggested that a septic infection was the true interpretation. In these and other instances retinal haemorrhages had high diagnostic value. The tracing in retinal haemorrhages of specific characters distinguishing between albuminuria and glycosuria might have a certain sporting interest, but could not be commended as a sound diagnostic method. In prognosis retinal haemorrhages played a part subordinate to clinical evidences from other sources. In chronic nephritis, for example, the fact of haemorrhages in the retina influenced the outlook as much or as little as the occurrence or non-occurrence of epistaxis. Both in the one and in the other the event was but a single member in a large series, and it was on the whole of the record, and not on a part of it, that a rational outlook for the future must be based. In all probability it was a sound proposition that a retinal haemorrhage was always preceded by damage, anatomical or nutritional, to the vessel wall.

Mr. G. H. POOLEY (Sheffield) said that in considering the significance of retinal haemorrhages there must be taken into account (1) the character or appearance of the haemorrhage, which varied to a certain extent according to the nature of the morbid process which had caused it, and (2) the age and general condition of the patient. Retinal haemorrhages occurred in the following conditions among others: nephritis, high blood pressure, arteriosclerosis, diabetes, trauma, thrombosis of retinal veins, glaucoma, and retinal conditions such as retinitis circinata or proliferans. Retinal haemorrhages varied in the depth in which they occurred in the retina. Some were on the surface of the retina—the so-called pre-retinal or subhyaloid haemorrhages. They were D-shaped and occurred in middle age. The blood usually came from the upper temporal vein, and in its descent, owing to the erect posture, covered the macula. The blood was generally reabsorbed within six months, and little, if any, impairment of vision usually, though not invariably, resulted. Some intraretinal haemorrhages were in the retina, but not very deep; these were striate or linear haemorrhages. Others also in the retina were larger, rounded or irregular in shape, and deeper than the striate ones. Many of these intraretinal haemorrhages were due to renal disease. The fewer and the smaller were the intraretinal haemorrhages the better was the prognosis. The absence of oedema of the retina and thickening of the retinal arteries was also very favourable. Conversely, large intraretinal haemorrhages with extensive white patches of oedema and marked thickening of the retinal arteries were signs of a very serious condition, in which the duration of life was calculated in months. This applied to all cases at all ages, though the younger the patient was the more serious was the appearance of retinal haemorrhages due to renal disease. Even if only one or two striate haemorrhages were present and there was no oedema of the retina, the outlook of the patient was grave—far graver than in an older patient. When the renal condition which caused the haemorrhages was secondary to some general infection, such as scarlet fever, the outlook was better, but even then a good many young patients died within three or four years of the appearance of retinal haemorrhages. In young patients, if in addition to rather large retinal haemorrhages there was distinct and considerable oedema of the retina and thickening of the retinal arteries, the prognosis was extremely bad; they seldom lived for twelve months. Often these patients only came to ask for glasses for the relief of headache; they usually had either large or small white kidneys, and died with sad rapidity. The older the patient and the more chronic the lesion of the kidney, the longer would the patient live. Patients over 60 years of age, with striate retinal haemorrhages associated with chronic interstitial nephritis, might live active lives for another decade. Retinal haemorrhages due to unduly high blood pressure were of bad omen, but, though many of these patients did not live more than a couple of years, some might recover and live a long time. One man, aged 65 when seen ten years ago, had then extensive retinal haemorrhages. He was still in good bodily health, though quite blind. On the whole, in renal disease the significance of retinal haemorrhages was of very serious importance, but, in the case of striate haemorrhages, the patients lived on the whole far longer than had been generally expected. It was only when, in addition to the haemorrhages, there was oedema of the retina and thickening of the arteries, that a very gloomy prognosis should be given. These were the only ones that died within the year; it used to be assumed that all renal cases with retinal haemorrhages did, whereas many of them lived for many years. The significance of the presence of retinal haemorrhages in diabetes was masked by the different response these patients made to treatment. In glaucoma the presence of retinal haemorrhages made the prognosis as bad as it could be. An examination of the retina by an ophthalmic surgeon in consultation with a physician might give valuable information.

Mr. M. L. HINE (London) congratulated Mr. Foster Moore on having so clearly classified the significance of retinal haemorrhages etiologically, but was glad that Mr. Pooley had also considered their significance from the point of view of the patient and their prognosis. He remembered two cases of subhyaloid haemorrhages over the macular area in otherwise healthy young men, both in the cable service. The blood came from retinal vessels below the macula, and both patients regained 6/6 vision. He had to give an opinion as to their return to work in out-of-the-way parts of the world, and advised that neither should be sent out until he had been free from recurrence for two years. In neither case had the haemorrhages returned in two years. He would be glad to know the percentage liability of recurrence in such cases, and the intervals elapsing between recurrences. He corroborated Mr. Foster Moore's statement that some cases of thrombosis of retinal vessels took a long time to clear up, and would not be too gloomy in giving a prognosis in such cases until after a long interval. In one patient he had some years ago at hospital there was thrombosis of the inferior temporal branch of the retinal vein in the right eye with many haemorrhages in the macular area and less than 6/60 vision. After six months the vision had not improved, and he gave a bad prognosis, but nine months later the patient came again to hospital and his vision in that eye was 6/12.

Dr. P. MACDONALD (York) reported another instance of a patient coming for glasses, and extensive retinal haemorrhages being found on examination. The urine was loaded with albumin and a gloomy prognosis was given to the family practitioner. This was many years ago, and the patient was still a vigorous active man; his disabilities, including his albuminuria, seemed to have disappeared.

Dr. A. CHRISTIE REID (Nottingham) thought that the chief significance of Mr. Foster Moore's paper lay in the new conception of haemorrhage which it opened up. The day might be not far distant when they would be able to classify retinal haemorrhages according to the actual blood constituents that had escaped. Haemorrhage without red blood corpuscles might be difficult to distinguish from an exudate, and this again from a transudate. Signs of actual bleeding (red corpuscles) were often sought without success in the undoubtedly haemorrhagic exudates of, say, retinitis circinata. They were still ignorant of the factors determining which of the blood constituents would pass through these very adaptable capillary walls.

Mr. W. H. MCMULLEN (London) insisted that to form an accurate estimate of the prognosis in cases of retinal haemorrhages associated with albuminuria examination of the urine alone was not sufficient. A complete testing of the renal functions was necessary.

Mr. H. L. G. LEASK (Glasgow) did not agree with Mr. Pooley that the prognosis was unfavourable in direct proportion to the size of the haemorrhage. A small haemorrhage might be of very serious import and a very large one clear up completely. In a case quoted, of general arteriosclerosis, with one minute haemorrhage there was a fatal

Localization.—The pocket slit-lamp is better for accurate localization than the half-watt lamp. With it we obtain a definite corneal prism, and can determine three zones in the cornea—the epithelial surface, the endothelial surface, and an intermediate zone, the corneal stroma. We can therefore in the cornea say that an object is on the surface, in the substance, or on the back of the cornea. We can do no more, but this rough localization is very valuable. It distinguishes between a deep and a superficial keratitis, and tells us that certain dots are not on the surface of the cornea but are keratic precipitates. This determination is not always easy with an ordinary diffuse oblique illumination. With the half-watt lamp we work from three mirrors: the corneal mirror, the mirror of the anterior capsule, and that of the posterior capsule of the lens. There is no definite corneal prism; the beam is not sharp enough to form one. The pocket slit-lamp shows up the more marked zones of discontinuity in the lens, and affords a fairly accurate localization of opacities. With both the half-watt lamp and the pocket slit-lamp a nuclear cataract is perfectly distinct, and a central opacity can be defined with ease. A lamellar cataract can be localized with the pocket slit-lamp. With both we are able to localize a posterior cortical or capsular cataract, but we cannot differentiate between a cortical and a capsular opacity. The depth of the anterior chamber can be gauged with reasonable accuracy, but we cannot see cells in the aqueous. Increased flare, if marked, is seen with the pocket slit-lamp.

Methods of Illumination.—With the exception of retro-illumination from the posterior capsule for the examination of minutiae in the cornea, all the varieties described for the slit-lamp are available. *Diffuse illumination* is gained by pushing the lens forward within the true focus. That given by the half-watt lamp is far more effective than the dim diffused light furnished by the frosted bulb found in many hospitals, a form of light inefficient for oblique illumination, and inappropriate for retinoscopy. All dark rooms require two lights: a half-watt for focal illumination, and a bright frosted bulb in a Thorington's chimney for retinoscopy. The ordinary light is a bad compromise. *Focal illumination* is easy to obtain. The beam can be directed at will upon any part of the cornea, or the iris, and can be projected on to any portion of the lens or into the vitreous. *Retro-illumination* is given from the iris and from the lens as a whole, probably mainly from the posterior capsule. *Specular illumination* is constantly used. With it under certain conditions we have seen that the endothelial shagreen is visible, but the magnification is insufficient to resolve it into cells. The anterior lens shagreen is a beautiful object, but the posterior is not seen except as a bright area of light. The sutures of the cortex and of the adult nucleus are easily demonstrated. The Y sutures of the embryonic nucleus are observed only under pathological conditions. *Scleral scatter* is probably of more real value when obtained by simple methods than with the slit-lamp. It is very useful to detect diffuse opacities in the cornea.

Technique to Find the Lens Shagreen.—The patient must direct his gaze in such wise that his line of sight bisects the angle between the visual axis of the observer and the illuminating axis; he must look half-way between the lamp and the loupe, and all three lines must lie in the same plane. The surgeon alters his position slightly till he gets the glare of the light from the lens, and he then raises and lowers his head till the shagreen shines out like freshly cast aluminium. A slight alteration in adjustment brings out the sutures of the cortex, which, as we have stated already, are better seen in their entirety with the loupe than with the microscope.

The Vitreous.—Much can be gained by the examination of the vitreous with loupe and half-watt lamp. A detached retina is often seen thus which cannot be brought into view with the slit-lamp. Haemorrhages and tumours are detected, and the vitreous fibrils are visible. It is hardly possible to detect a pathological vitreous with the loupe unless very advanced, but asteroid hyalitis at once attracts the attention.

The visible circulation can be seen in a vascularized cornea and at the normal limbus, but the latter is difficult to detect, and is a test of high proficiency with the loupe. It probably calls for exceptional eyesight and for dark adaptation. The visible circulation in a pannus can occasionally be seen in daylight with the light of a half-watt lamp and loupe. Very occasionally focal illumination of the retina by the filament of the ophthalmoscope will demonstrate the circulation in the smaller retinal vessels. This phenomenon has been observed, not only by the author, but by Mr. Rudd, surgical registrar to the Birmingham Eye Hospital, and quite independently.

Technique to See the Visible Circulation.—In all cases even in the retina, the vessel must be viewed by retro-illumination. In the case of the limbus the light is focused on to the sclera in such wise that it is reflected back through a conjunctival vessel to the eye of the observer. Corneal vessels are illuminated from the iris, and retinal vessels from a deeper layer of the retina.

The pocket slit-lamp is of very real value to one trained in slit-lamp technique who not only knows exactly how to manipulate the light, but also realizes what he is looking for. An object previously invisible with the loupe is often seen perfectly when it has been examined with the slit-lamp.

NAGEL S ANOMALOSCOPE

BY

ARNOLD VERREY, M.D.,

Lausanne.

(*Abstract.*)

MODEL I of Nagel's anomaloscope enables an investigator to look for Rayleigh's equation (lithium red mixed with thallium green, equal to sodium yellow). It is by means of this match that anomalous trichromics are best detected. Not only is the knowledge gained, as by other ways, such as lanterns and isochromatic tables, that these patients are deficient in colour perception, but an exact diagnosis of their defect can be made. With this apparatus any source of light can be used, but Rayleigh's equation will not be the same for the different kinds of light. Three slits let in rays which divide into their components on three prisms disposed in the centre of the apparatus. The first two are twin slits, and use is made of the green rays of the one and the red rays of the other. The combined breadth of these two slits moving together is equal to one millimetre, so that it is possible to get pure green, pure red, or a mixture of both. That mixture is matched with yellow, of different luminosities, let in by the third slit, which is independent of the twin slits.

If electric light is used, normal people have an exact match between the mixture and yellow when the red slit is open to three-quarters of its breadth and the green slit to one-quarter only; the yellow must be of low luminosity, the slit being open to one-quarter only. That equation is an "exact match," the sensitiveness for colours of normal people enabling them to note the least change produced in the mixture if the proportion of red and green is changed. Abnormal people can give all kinds of abnormal matches—from those who find such matches, with more green and less red than normal people, or vice versa, and those who find "match regions" in which many matches are possible; the latter show in that way diminution of sensitiveness for both colours at the same time.

While Model I permits researches for green and red only, Model II, with its special device, is a real spectroscope, allowing all kinds of different matches to be made, including a blue equation, which renders possible the discovery of diminution of sensitiveness for blue. It can also be used as a simple spectroscope; by means of the spectrum a diagnosis is very much facilitated. Detection is rapid of shortening in the red or the blue end, and of neutral sections in the yellow, green, or blue-green parts of the spectrum, as they may be found in tritanopes (blue blind), deuteranopes (green blind), or protanopes (red blind).

Diminution of blue perception seems a very rare condition as a congenital dyschromatopsy, but is much more frequent in acquired dyschromatopsy. Macular blue blindness seems to be found not only in affections of the retina, but in disorders of the optic nerve alone. In these last affections sensitiveness for blue is often more diminished than for red and green.

and algebra within reach; spur-wheels, Braille compasses and rulers are used for geometry and trigonometry; relief globes and maps, and many other such devices help to make full mental development on normal lines practicable.

There are thirty-two pupils now in residence; former students number ten. It is early to count successes, but already one has entered Oxford University, another St. Andrews University, and one is now a teacher of English in Sweden; two will shortly start small schools—one in England, another in South Africa.

Recreation has been well thought out. There is "free-time" after dinner, usually occupied by voluntary hand-work, with reading aloud; but impromptu concerts, dances, charades, and debates are popular. A school magazine has been produced, and for so small a company is uncommonly good; the originals are in Braille, but they have been done into typescript for circulation amongst friends. Outdoor games are played on a clear level lawn of half an acre bounded by a wide gravel walk, which makes the guide of safety. A satisfactory ball game has been evolved, something after the fashion of Association football, except that it is played by hand. The ball is of covered wicker-work and in it is a bell which gives by sound the sense of position. So clever have the girls become at this game that on one occasion they beat a team of sighted girls. The girls take a practical share in the work of the house by making their beds, managing meals, caring for the class-rooms, and so forth. Thrice a year there is "parents' day," on which the girls entertain their friends and give a concert or other performance. That the girls are thoroughly happy in their college life there can be no manner of doubt. The shy, solitary, self-centred blind girl soon learns through comradeship to cast off that sense of separateness which a physical handicap is apt to engender, and in so doing takes the first step to the acquisition of independence.

The inspection by the Board of Education last year has been referred to. Dr. Eichholz, senior medical officer of the Board, and three of His Majesty's inspectors, Messrs. W. C. Fletcher, T. W. Phillips, and F. Spencer, made a complete examination of the work of the college, and their report has been published in an eight-page pamphlet issued by H.M. Stationery Office. It is a most satisfactory report, and may well be put into the hands of any inquirer.

In conclusion I desire to stress the responsibility of every ophthalmic surgeon, and, indeed, of every medical practitioner, to such of their patients who are blind or nearly blind girls, or, in the terms of the college, "who have little or no sight"; when all has been done for them by way of medical treatment, no greater good can be given them than an introduction to such a college as this. It may be thought that this or that girl may be well taught at home by a succession of capable governesses. But the girl who enters this college will find a happiness beyond compare with the solitary life of the blind girl in the best of homes. To be taught in company with others is infinitely more stimulating to the mind than the monotony of the most assiduous solitary teaching, whilst the play of wits engendered by life in a community such as a public school of itself affords a training that will give the blind girl a capacity for independence of judgement and of action which is an endowment of no mean advantage in these days.

SLIT-LAMP TECHNIQUE APPLIED TO SIMPLE APPARATUS.

BY

T. HARRISON BUTLER, M.A., M.D.OXON.,

Surgeon, Birmingham Eye Hospital; Honorary Ophthalmic Surgeon, Coventry and Leamington General Hospitals.

THE slit-lamp has greatly amplified that method of examining the eye which is known as oblique illumination. It throws a sharply defined beam of intense light into the eye, a beam which can be narrowed down till it is about one-fortieth of a millimetre in width, and one which can be focused at will upon any point in the anterior half of the eye. The narrow beam gives an "optical section" of the eye; all the structures can be seen in profile, and in consequence accurate localization along the optical axis of the eye becomes possible. In a word, the slit-lamp gives us the third dimension which was necessary to enable us to visualize the eye as a solid. A second advantage of the slit-lamp is the ability to concentrate a powerful beam upon a reflecting surface and employ this as the source of illumination. Thus the cornea can be examined in light reflected from the iris, and the iris in lens light. There are other variants of illumination which are now so well known that they need not be mentioned.

It is easy to see that the slit-lamp has become indispensable to many ophthalmic surgeons, and that all cases cannot be completely diagnosed without it. Unfortunately, the apparatus is not always available. It is not portable, and not every patient can be brought to it. Some surgeons have more than one consulting-room, and the cost of the instrument forbids its duplication. Fortunately much of the technique that has been developed for the slit-lamp can, to a considerable extent, be carried out with the simple articles that should be found in every consulting-room. A suitable lamp, an electric ophthalmoscope, a condensing lens, and the ordinary or the binocular loupe intelligently used, will solve many of the problems hitherto reserved for the slit-lamp. The essential feature of the more elaborate apparatus is not the high magnification of the Czapski microscope, but the refined command of the illumination and the localizing power conferred by the slit-lamp. Much of the work accomplished by the instrument can be carried out with the lowest objective, with a magnification of but nine diameters, which is little more than that of the ordinary loupe, and nearly all can be managed with an enlargement of 15. It is therefore obvious that if we can supply a suitable focal beam much can be done with the loupe, if this be used to its best advantage. An effective beam can be gained by two methods: we can focus a bright linear source of light upon the eye with an ordinary condensing lens, or we can use the filament of an electric ophthalmoscope. Both methods are valuable. The latter plan was brought to my notice by Mr. Coulter of Newport.

I have tried out various sources of light. The pencil furnished by a "point o' light" lamp, or by a motor head-lamp bulb, has not proved so effective as the much simpler half-watt bulb which is found in every house, and which does not need a resistance or transformer to step down the town voltage. A 60-watt lamp, placed at about four feet from the patient, is the best, and can be made to give a streak of bright light. The lower powered bulbs are now badly made, the filament soon hangs in loops, and no longer supplies a linear source of light.

Many electric ophthalmoscopes, especially the Hamblin, will give a parallel beam if the bulb be drawn right back; if they do not they are out of adjustment and should be returned to the maker. This property has been utilized in my pocket slit-lamp made by Messrs. Hamblin. There is no hole in the mirror, and the instrument furnishes a sharp beam of remarkable intensity. The lamp costs £2.

Half-watt Technique.—The bulb must be placed at about four feet from the eye of the patient, and at such a height that the plane of the circular filament lies on the line joining the bulb to the eye. If it be higher or lower we get, not a line, but an ellipse of light. The light is focused upon the cornea, and is seen as a bright line. The loupe is held between the thumb and the forefinger by its cover, the middle finger raises the lid, and the ring and little fingers rest upon the patient's forehead. The forehead of the observer rests upon his bent forefinger, and a meticulous focus is obtained by an alteration in the flexion of the ring-finger. We must emphasize the fact that to see such a phenomenon as the actual circulation of the blood with the loupe it is necessary to focus the loupe within a fraction of a millimetre. The condensing lens rests against the surgeon's forehead. By this method the patient and the observer are one, and any movement of the patient does not disturb either the focus of the lens or that of the beam. It is necessary to focus the beam just as accurately as the beam of the slit-lamp, and to learn simultaneously and instinctively to move the combined focus from one object to another. The pocket slit-lamp is used in a similar way.

Since then, despite its narrow margin of anaesthesia, its besetting problem of anoxaemia, and the skill and equipment required for its satisfactory use, to those who have mastered both the physics and physiology of its administration nitrous oxide-oxygen remains the unrivalled method of anaesthesia for any and all operative procedures in normal or the "worst risk" patients. Those who maintain this attitude have not found that a comparative balancing of advantages and disadvantages warrants the replacement of nitrous oxide with either acetylene, ethylene, or propylene. Their greatest concession is the use of one or the other of these newer gas anaesthetics as a synergist in combination with nitrous oxide-oxygen. Those who, for various reasons, have not elected to pursue nitrous oxide-oxygen anaesthesia to its ultimate possibilities have found in the newer gas anaesthetics a somewhat less exacting technique, a broader margin of anaesthesia, as well as an extended scope and utility in the domain of surgical procedures without appreciably any more harm to the patients.

Dissension among anaesthetists or a scientific feud based on this difference in attitude would be deplorable; especially as interest in the widespread use of the newer gas anaesthetics promises an era of physiological anaesthesia and research that nitrous oxide-oxygen has never been able to promote or secure alone. Curiously enough, in a certain sense, this newer era of gas-oxygen anaesthesia harks back to the first conceptions of surgical anaesthesia in an older era of "pneumatics" in which some of the gases now in use were first discovered and used

Nitrogen and Hydrogen Anaesthesia.

In this connexion it should not be overlooked that many of Nature's elements are potentially anaesthetics, and are only inefficiently so because the human body cannot use them in certain chemical forms for entirely satisfactory anaesthetic effect.

Thus nitrous oxide may be considered as the practical form of nitrogen anaesthesia. Since unconsciousness may be produced with difficulty by administering nitrogen with less oxygen than is contained in air, there must be some difference between it and nitrous oxide-oxygen which produces anaesthesia with such ease. This difference seems to be in the comparative solubility of the two gases. Nitrogen is nearly insoluble in the body fluids and leaves oxygen free access; while nitrous oxide is more than one hundred times as soluble in the blood serum as oxygen. Hence, although nitrous oxide of itself has no known action upon the cells and tissues of the body and is only acted upon by other chemical substances with the greatest difficulty, it reaches the tissues more readily and thus restricts the volume of oxygen available for metabolism and induces the anaesthetic effect.

A curious side issue of nitrous oxide-oxygen anaesthesia is this: Its margin of anaesthesia is so narrow that to be entirely successful and satisfactory almost the last vestige of nitrogen must be displaced in the body by nitrous oxide, and this is exactly what is attempted in the clinical technique of "secondary saturation."

From this same viewpoint hydrogen anaesthesia has been the predominant basic method during the past eighty-odd years of actual surgical narcosis. Hydrogen-oxygen is a somewhat more effective anaesthetic than a nitrogen-oxygen mixture, but equally difficult to handle. It is not at all surprising, however, that some of the unsaturated hydrocarbons, now challenging attention as the newer gas anaesthetics, should be proving themselves effective, since they are in reality merely gaseous counterparts of the commoner liquid anaesthetics (ether, chloroform, and ethyl chloride) that have withstood the tests of time and routine use.

Now, as during the past, these same two elements, nitrogen and hydrogen, compete for superiority in anaesthesia, but on a more even footing. While certain physico-chemical differentials still persist to the advantage or disadvantage of each, both elements are now being used in their most effective forms by means of perfected gas methods and apparatus as well as impartially with oxygen.

Theories of Anaesthesia.

A consideration of certain developments in the theory of anaesthesia will help to a better understanding of these physico-chemical differentials. Recently an explanation of the phenomenon of anaesthesia has been attempted in relation to the newer physics of the atom. By placing two guinea-pigs in circuit with each other and a very sensitive galvanometer, it was found that, irrespective of different initial potentials, the anaesthetized animal always became more and more electro-positive to the other as anaesthesia deepened, and less positive as anaesthesia disappeared. This may seem rather inexplicable until it is recalled that the only actual electricity is negative. From this it may be assumed that one of the basic reactions of anaesthesia (if not its fundamental mechanism) is a decreasing electro-negative potential.

It is a further noteworthy fact that oxygen is the predominating negative element in nature, and as such, oxidation may be looked upon, in relation to the phenomenon of anaesthesia, as identical with electro-negative potential. Anaesthesia on this basis would involve a decreasing metabolism.

Further investigations on single guinea-pigs under various gas anaesthetics disclosed an interesting differential between nitrogen and hydrogen reactions. The hydrocarbon anaesthetics (ether, chloroform, and hydrogen-oxygen) gave very definite increases in voltage, while nitrous oxide and carbon dioxide almost as proportionately decreased voltage for similar depths of anaesthesia (E. A. Tyler and D. C. A. Butts).

So much for a concept of the phenomenon of anaesthesia that may further intrigue the research physicist and biochemist, and may interpret anaesthetic reaction in subtler terms of protons and electrons as well as the colloidal chemistry of cellular constituents.

Another concept of anaesthesia, the metabolic, offers more practical possibilities to the clinical anaesthetist. This concept has been detailed as a workaday basis of gas-oxygen methods of anaesthesia. Life depends upon oxidation much as a fire in a stove depends upon oxygen. Let the flame represent consciousness (and sensation to pain). Since metabolism, or combustion measured by the oxygen consumption, is reduced in normal sleep and in anaesthesia under various drugs, and since a restriction in the oxygen administered also produces unconsciousness, it appears that anaesthesia is the result of suboxia of the nervous system.

Like the fire in a stove, consciousness (and pain sensation) —the flame—may be extinguished without "killing" the fire in at least two ways: First, indirectly by "soaking" the fuel, which physically or chemically hinders combustion even with an open draught. This seems to apply to such anaesthetics as ether and chloroform, since they attack the lipoids contained in all cells, and in addition to producing unconsciousness and loss of pain, also disorganize the specialized functions of the kidney, liver, and other organs containing relatively large amounts of lipoids acted upon by these drugs. The heart is less affected because it contains less lipoid, but it also suffers considerably through its connexion with the nervous system, which is rich in these substances. Ether and chloroform are not only powerful anaesthetics, but on account of their high boiling point linger in the system and are only slowly eliminated, giving time for undesirable chemical by-effects. In this connexion the newer gas anaesthetics are more desirable than their liquid counterparts because their extremely low boiling points offset their lipoid solubility and the rapidity of their elimination obviates serious biochemical complications.

A second method for the reduction of the fire in a stove consists in the ordinary direct regulation of the draught, or the mechanical restriction of oxygen. This is analogous to the control of anaesthesia by the regulation of the oxygen percentage in gas-oxygen mixtures. This is more essentially the way in which nitrous oxide (and carbon dioxide) produces the anaesthetic effect. With practically no action upon the cells, tissues, and organs of the body, nitrous oxide, on account of its solubility in plasma, restricts the volume of oxygen available for metabolism. Anaesthesia then results from reduction of combustion in the nervous system.

In this connexion it must also be realized that the human body is a stove containing many fuels of varying combustibility, and that certain vital functions are carried on

The author is persuaded that if macular sensitiveness for blue was tested otherwise than with the perimeter only, means of classifying cases of atrophy of the optic nerve in an earlier stage of the affection would certainly be found. For all these purposes Nagel's anomaloscope is a most handy and practical apparatus.

STEAMY CORNEA IN CASES OF NON-INFLAMMATORY INCREASED TENSION.

BY

GEORGE YOUNG, M.D.,

Ophthalmic Surgeon, Essex County Hospital, Colchester.

(*Abstract.*)

No satisfactory explanation of steamy cornea has yet been proposed. It cannot be due to an exudate, because the cornea is non-vascular, nor can it be attributed to the forcing in of aqueous humour, since Descemet's membrane is impermeable. It is seen in pressing on enucleated eyes, and disappears immediately the pressure is relaxed. Personal experiments show that pressure on the eye will first produce rapid restriction of the visual field, then of vision, the fixation point disappearing last. The subject of my next investigation may be the estimation by means of a suitably constructed dynamometer of the pressure in grams required to obliterate vision in a large number of normal eyes. Any findings below the minimum probably indicate the presence of high tension. With very light pressure, sufficient only to constrict the peripheral field, the test types at 6 metres show duplication of the letters, and lines of print at reading distance show shadowy images, which change their relative position as the pressure is altered. The image of the Javal mires are clean cut in normal corneae, even when the fixation is changed from the centre of the tube to one edge or the other. In steamy cornea with quite smooth epithelium the images show duplication of the edges of the mires varying with the change of fixation. I suggest that possibly there is a shifting of the surface epithelium causing polarization of light, and perhaps a shifting of the corneal layers, causing the iris pattern to look smudged where there is certainly no inflammatory reason for this appearance. This also causes us to see objects duplicated when we press our corneae. The duplication of the Javal image might well be due to a second, feebler image being reflected from the second layer of epithelium, these layers being extremely thin. Less weighty, perhaps, though suggestive, is evidence derived from the examination of microscopical sections. Corneal epithelium is found to be laid down very regularly, like bricks, in the normal cornea, the cells being all tumbled about in old-standing glaucoma. A shredding of the corneal layers is found to be quite regular and symmetrical in normal sections, while in glaucoma cases it often appears that in separating under the microtome they have shifted against each other, the meshes thus formed appearing distorted and giving an appearance of traction that has been relaxed. Slit-lamp experts might be able to clear up this point, for in the Javal image of steamy cornea, if a miotic is instilled and it be viewed after the steaminess has vanished, the image no longer appears duplicated. I suggest that if certain fixed points on the surface of the cornea were observed—for instance, in their relative position to a certain patch of endothelium, before and after the administration of a miotic—some knowledge might be gained.

DISCUSSION.

Mr. BASIL GRAVES (London) suggested that, when speaking of a "dull cornea," they must distinguish between a simple dulling of the view of the iris pattern—a sign used in the clinical examination of glaucoma cases—as the result of an abnormality of the cornea through which the iris was viewed, and a dulling of the corneal reflex which produced, for example, the window image—a manifestation dependent on a smooth surface of the epithelium; in fact, the thin capillary layer of tear fluid on the epithelial surface was the actual mirror. He had always understood that the essential alteration of the corneal epithelium when the tension was raised was due to microscopic globules of fluid collecting at first between the larger basal cells of the epithelium on the face of Bowman's membrane. Such fluid vacuoles were often seen by slit-lamp technique in cases in which the tension was not raised; in certain cases of iridocyclitis they were familiar to slit-lamp students. When present thus, in fine degree, they did not give rise to any disturbance of the surface contour of the epithelium, and hence the mirror effect of the surface of the epithelium was not impaired—the window reflex was still bright. But if these droplets became more numerous they coalesced, and gave rise within the epithelium to droplets of such size that they impaired the surface contour of the epithelium, and hence impaired the mirror properties of its surface. At the same time it was conceivable that the transmitting qualities of the epithelium so affected were sufficiently poor that the view through it of deeper structures, such as the iris pattern, was poor. In connexion with this droplet formation it might be pointed out that Vogt early drew attention to the normal haze, by retro-illumination, of that part of the epithelium which was near its vascular supply—namely, the corneal epithelium near the limbus; this was physiological. Whatever caused this, be it a physiological "oedema," the internal condition of the epithelium was insufficient to disturb its surface contour, and hence the mirror properties of the moist surface of the epithelium here were, in the normal, quite good. These explanations were put forward without intending to furnish a destructive criticism of Dr. George Young's hypothesis. There might be doubling of images when the cornea was pressed on in Dr. Young's experiment; it might be explained simply by the astigmatism caused by pressure on the globe. Mr. Graves had had no previous opportunity of considering Dr. Young's views, which he then heard for the first time. Apparatus made by Messrs. Zeiss was readily available for examination of the eye by polarized light, a polarimeter being available for the arc slit-lamp and an analyser for Koeppe's special microscope made for use with the slit-lamp attachment.

In reply to Mr. Bishop Harman, Dr. GEORGE YOUNG said that he thought the disappearance of the steaminess after corneal section was rather in favour of his view than against it, because the dislocation of the corneal layers was likewise released, and it mattered little whether they were relaxed by the miotic or by corneal section.

SECTION OF ANAESTHETICS.

SAMUEL JOHNSTON, M.D., President.

DISCUSSION ON NEWER GAS ANAESTHETICS: SOME COMPARATIVE CONSIDERATIONS.

OPENING PAPERS.

I.—F. H. McMECHAN, M.A., M.D.,

Secretary-General, Associated Anaesthetists of the United States and Canada; Editor, Executive Secretary, International Anaesthesia Research Society.

IT has been said that the ideal anaesthetic gas should be one (*a*) with a sufficient solubility in water (plasma) to be carried to the central nervous system, and (*b*) such a high degree of solubility in the lipoids as to lead to its differential accumulation there. Further, such an ideal anaesthetic (*c*) should leave the body promptly and entirely unchanged (V. E. Henderson).

Contrasting Viewpoints.

Although some of the so-called newer gas anaesthetics have been investigated experimentally and tried out clinically in the past, nitrous oxide is the only anaesthetic gas that has held its place with such anaesthetics as ether and chloroform since the very beginnings of actual painless surgery. In so doing it has lived up to the expectations of Horace Wells, who in his day steadfastly maintained its superiority, not only in dentistry, but in surgery as well. Of course, Andrews of Chicago gave nitrous oxide a new lease of life in establishing its use with oxygen and introducing the non-asphyxial era of gas-oxygen anaesthesia.

higher member of the series of gases kills readily at the same percentage mixtures at which the previous one maintains safe anaesthesia.

Normally nitrous oxide has the narrowest margin of anaesthesia and the most limited range of percentage mixtures. Not infrequently in pure gas-oxygen administration a leeway of 1 per cent. in the oxygen percentage may definitely determine the control of anaesthesia. Induction may be accomplished either with 100 per cent. nitrous oxide followed by oxygen or by 93 per cent. nitrous oxide and 7 per cent. oxygen; or a combination of both methods. During maintenance 10 to 15 per cent. oxygen is rarely exceeded, except in the presence of shock, haemorrhage, anaemias, profound sepsis, toxaemia, or cachexia.

Under such conditions the required oxygen percentage may mount to 35, 50, 60, or even higher. Surgical relaxation may be secured by the technique of "secondary saturation" or by the use of synergists. At this point it should be noted that the usual slight duskiness of colour under nitrous oxide-oxygen anaesthesia is no more an indication of cyanosis than the peculiar rosy blush under ethylene-oxygen is an assurance that no anoxaemia is present.

With ethylene it is usually possible to induce anaesthesia with mixtures of 90 to 85 per cent. ethylene and 10 to 15 per cent. oxygen from the beginning. During maintenance the required oxygen percentage may rise to 20 per cent. or more; and better surgical relaxation frequently follows short periods of oxygen up to 40 and 50 per cent. mixtures. Ethylene is thus shown to be slightly cumulative during its administration; although, on account of its low boiling point (−137° F.), it is almost as rapidly eliminated as nitrous oxide. This slightly cumulative effect, being due to a higher solubility and some sort of undisclosed and transient physical combination with the lipoids, determines the higher oxygen need, a somewhat wider margin of anaesthesia, and a more intensive obtundent or analgesic effect.

The popularity and widespread use of ethylene has been made possible because ethylene and nitrous oxide are so nearly alike in physical properties that apparatus calibrated for nitrous oxide can be used for ethylene with a margin of error that merely gives a slightly misleading idea of higher oxygen percentages than really obtain. Under similar conditions of administration the increased oxygen range with ethylene does not differ much more than from 3 to 7 per cent. in comparison with nitrous oxide. As with nitrous oxide, the pathological conditions already mentioned demand excessive oxygen percentages. The use of synergists with ethylene for surgical relaxation, especially in abdominal operations, is still rather routine. Very curiously some patients who are resistant to nitrous oxide are more susceptible to ethylene and vice versa. Ethylene may readily be used in sequence or combination with nitrous oxide through the same apparatus with proper attachments; many anaesthetists prefer nitrous oxide for the induction and recovery phases of ethylene anaesthesia (A. D. Luckhardt, W. Easson Brown, T. C. Herb).

Acetylene, according to its place in the series of hydrocarbon gases, should be a weaker anaesthetic than ethylene. The fact that it is compressed with acetone, and that acetone has narcotic properties, may account for its apparently increased clinical potency. Ethylene made with an ether coefficient shows this same increased potency.

Acetylene anaesthesia may be induced in the presence of 20 per cent. oxygen, which may be increased to 30 per cent. in a minute or two. During maintenance the greater solubility and cumulative effect of acetylene usually require an increase of 5 per cent. oxygen and a similar decrease of acetylene in the anaesthetic mixture every five minutes. Thus the closing steps of a long operation may be done under 30 to 40 per cent. acetylene and 70 to 60 per cent. oxygen. Apparatus for acetylene anaesthesia should be especially calibrated for that gas, and the acetone vapour may be eliminated by means of a small filter of activated carbon.

The rapidity with which the oxygen percentage has to be increased during acetylene anaesthesia will depend in great measure on the pathological condition of the patient and the necessity for surgical relaxation. It is being found that, in spite of the apparently greater potency and toxicity of acetylene, it is still sufficiently innocuous that rebreathing during its administration is quite as feasible as with nitrous oxide (H. Wieland, A. and J. D. Goldman).

Propylene is the only other of the newer gas anaesthetics that has been tried out in the operating-room. Experimentally it offered some unique possibilities: (*a*) it was more potent than ethylene or acetylene without being too toxic; (*b*) it could be used satisfactorily with percentages of oxygen that obviated anoxaemia and maintained the alkaline reserve; and (*c*) more than this, a third gas (nitrogen) could be used at the same time to render the anaesthetic mixture non-explosive to static and perhaps to other sources of ignition as well.

While differing somewhat in relation to the sort of experimental animals used, in a general way propylene concentrations of from 35 to 50 per cent. are effective for induction, and 20 to 40 per cent. for continuing anaesthesia. Usually percentage ranges of from 25 to 35 per cent. suffice for meeting the oxygen need, and the remainder of the mixture may be a third gas (nitrogen). At 60 per cent. concentration propylene causes a slow and at 70 per cent. a rapid fall in blood pressure; while concentrations of from 75 to 80 per cent. are rapidly lethal.

Experimentally low concentrations of propylene have a wide margin of safety—thus in white rats anaesthesia may be induced by 70 per cent. propylene within three minutes, and respiratory failure occurs after eighteen to twenty minutes; but while 55 per cent. propylene will also induce anaesthesia in three to six minutes, this concentration may be continued for seven hours before respiratory failure sets in.

Propylene has been used in a brief series (nine) of operations in the three-gases mixture already mentioned (propylene-oxygen-nitrogen), and while induction, anaesthesia, relaxation, and immediate recovery were satisfactory, profound circulatory collapse occurred in all but two of the patients five to seven hours after operation. Fortunately remedial measures were effective and all the patients recovered.

Beginning with propylene, the newer gas anaesthetics of the hydrocarbon series show by-effects that, for the present, challenge their safety and utility in clinical anaesthesia. It must be frankly admitted that the clinical trial of propylene was in no sense final—the apparatus was not calibrated for propylene and was a makeshift for the use of three gases; and further than that, an accurate technique for three-gases anaesthesia has not yet been developed and its physiology is still unrevealed. These considerations are an alluring prospect to the anaesthetist, and offer a new world of conquest. In so far as propylene itself is concerned with remote circulatory collapse, it was found by electro-cardiographic studies that even in non-anaesthetic concentrations it causes ectopic heart beats. Propylene is not entirely free from a tendency to rigidity of a peculiar type that is more pronounced with butylene.

Induction with butylene with just anaesthetic percentages is relatively prolonged and complicated by a clonic type of rigidity of the extremities such as is seen in decerebrate animals under light ether or as so-called "ether tremor" in clinical anaesthesia. This clonus may continue during complete anaesthesia. While 30 per cent. butylene will maintain anaesthesia (in cats), even with this percentage blood pressure is lower than normal, and under 40 per cent. butylene the blood pressure is very low. The same disadvantages pertain to amylene.

Experiments with methane, propane, pentane, and heptane do not offer any hope of a satisfactory clinical anaesthetic. Their anaesthetic action is variable and uncertain; their toxic and anaesthetic doses are too close together; their effects on respiration and circulation are variable and undesirable; and secondary stimulation may persist when anaesthesia appears to be complete (V. E. Henderson, W. Easson Brown, Lloyd K. Riggs, J. T. Halsey, Ansel Caine).

The several newer gas anaesthetics that have secured a place in clinical anaesthesia seem to have distinctive entities, but their differences are more apparent than real. Conceivably anaesthesia occurs when a certain, still unknown, concentration is secured in the nerve cell, which,

at entirely different levels and intensities of metabolism. Thus nervous tissue requires almost twice as much oxygen as other tissues and also contains comparatively excessive amounts of lipoids; therefore, its special functions may be suspended (1) by the effect of oxygen restriction; and (2) partial saturation with lipoid-soluble anaesthetics, long before other vital functions are infringed upon (E. I. McKesson).

The Acid-Base Equilibrium.

These factors of oxygen restriction and lipoid saturation in relation to gas-oxygen anaesthesia involve changes in the acid-base equilibrium, or hydrogen-ion concentration and CO_2 combining power, which is a further basic consideration in the conservation of the akaline reserve. These changes, depending on their extent, may both influence the sort of anaesthesia secured and the types of complications presenting.

In making these changes in acid-base equilibrium as negligible as possible certain details of preparation and technical points in administration are essential:

1. Such premedication as will (*a*) stabilize the circulation; (*b*) bring the basal metabolic rate as near to normal as possible; and (*c*) re-establish and maintain the alkaline reserve, should be used to full effect.

2. The oxygen percentage in the gas mixture should approach the permissible maximum that obviates anoxaemia without invalidating the plane of anaesthesia required for the surgical procedure.

3. Rebreathing (preferably fractional) should be utilized to provide carbon dioxide control for any desirable manipulation of respiratory function, especially in avoiding overventilation and consequent acapnia.

When these essentials are observed all sorts of gas-oxygen anaesthesias (nitrous oxide, acetylene, ethylene, propylene) may be more easily given, are more efficient, and any possible by-effects are reduced to a negligible minimum.

If the various gas-oxygen anaesthesias have any claim to superiority more important than any other, it is that, even under prolonged administration, the blood pressures are not inclined to fall. To clinch this advantage, however, it is also vitally necessary to use such cardiac therapy (digitalization) as will conserve myocardial efficiency, and such transfusions (blood, salines) as will maintain not only a volume flow sufficient for vital functions, but also a blood stream capable of carrying on oxygenation.

Increased metabolism makes any method of gas-oxygen anaesthesia more difficult because the intensified oxygen need narrows the range of anaesthesia. *Plus* basal metabolic rates should be brought nearer normal by means of proper sedatives (morphine, hyoscine, quinine, chloral, Lugol's solution, and certain endocrines—ovary, pancreas, liver extract), not only for the safety of the patient, but also for the convenience of the surgeon and anaesthetist in securing more satisfactory anaesthesia.

On the contrary, in the presence of *minus* basal metabolic rates patients may be unusually susceptible to gas-oxygen anaesthesias, and danger may be involved in the further depression of metabolism by the anaesthetic. Under such conditions efforts should be made to raise the basal metabolic rate more nearly to normal by stimulative therapy (atropine, caffeine, and certain endocrines—adrenaline, pituitrin, thyroid).

The problems of anoxic acidosis and acapnic alkalosis are definitely bound up with conservation of the alkaline reserve in relation to the patient's blood and tissue chemistry reactions, as well as to the technique of administration. If the alkaline reserve can be established at the approximate normal by means of carbohydrates, fruit juices, and alkalis, and the toxaemias of disease and pathology can be counteracted by insulin-glucose, then gas-oxygen anaesthesias scarcely affect either the carbon dioxide combining power or the hydrogen-ion concentration unless the technique of administration involves a tendency to acidosis from the anoxaemia of oxygen want, or alkalosis from the acapnia of overventilation and carbon dioxide depletion.

By-Effects of Impure Gases.

With the fundamental concepts of the phenomena of narcosis already mentioned, as well as the other essentials underlying all forms of gas-oxygen anaesthesia, duly in mind, the various gas anaesthetics now available for routine use may be further discussed in certain comparative aspects and relations.

Surprising as it may seem, even the anaesthetics that have been longest in use are not yet supplied in absolute and constant purity. Witness the efforts to make a purer ether by means of crystallization with benzidine; to prevent deterioration by production and packing in the presence of inert gases; or to enhance potency by the incorporation of synergists. Even now a new chapter in the current literature of anaesthesia is being written on the by-effects of ether deterioration impurities, and promises some rather startling revelations.

Nitrous oxide still provides its quota of occasional drawbacks and impurities—too much moisture, nitrogen dilution, definite nitric oxide and ammonia contamination, as well as variegated organic odours. Witness, again, the efforts of manufacturers to dry intensively, eliminate dilution, repurify with finely divided metals, and deodorize with activated carbon.

With the newer gas anaesthetics both purification during manufacture and prevention of deterioration during storage are still besetting difficulties. There may be hydrogen or carbon dioxide dilution, as well as aldehyde and peroxide, sulphin, and phosphin, or, worst of all, carbon monoxide contamination. Even oxygen for use with anaesthetics may be diluted with nitrogen or hydrogen, and carbon dioxide for resuscitation may contain carbon monoxide.

The more intensively gas anaesthetics are dried the better they lend themselves to use without inconvenient freezing of valves and connexions, and serious interruptions of flow and volume. It is understood that nitrous oxide can now be dried to a moisture content of 0.005 per cent. The acetone and ether coefficients of acetylene and ethylene seem to provide the same practical advantage while also acting as solvents and allowing an equal gallonage of gas to be compressed in a given cylinder under much lower than the usual pressures.

Seemingly low and inconsequential dilutions of anaesthetic gases or oxygen with hydrogen or nitrogen in the cylinder may so narrow the range of percentage mixtures that anaesthesia may become very difficult or entirely unsatisfactory and the indicated oxygen percentages quite deceptive.

Certain impurities in anaesthetics may merely involve disagreeable odours or tastes (sulphins, phosphins); others may be responsible for nausea and vomiting (aldehydes, peroxides); while still others may induce pathological conditions leading to endangering complications or even death (nitric oxide, ethylene oxide, carbon monoxide). As most of these are effective when present in traces represented by percentages in the second to fourth decimal places, their absolute elimination is imperative.

Comparative Potency and Toxicity.

There is some confusion about the comparative potency and toxicity of the various gas anaesthetics, partly because most of them, like nitrous oxide, are eliminated intact, and are therefore looked upon as being equally "inert"; and also on account of the fact that some admit of complete and satisfactory anaesthesia in the presence of percentages of oxygen higher than are contained in air, and even further dilutions of the percentage gas mixture with the more insoluble gases.

However, in studying potency and toxicity in relation to minimal and maximal anaesthetic and lethal dosage, the series of gas anaesthetics may be considered as having somewhat the following gradients, with ethylene as unity: nitrous oxide 0.85; ethylene 1; acetylene 1.5; propylene 2.25; butylene 4.5; and amylene 15.

A further clinical concept of these gradients may be had by a comparison of the usual percentage mixtures of these gases and oxygen for the induction and maintenance of anaesthesia. In a schematic way it may be said that each

and acapnia. That this effect need not be pronounced may be seen from the results in a series of 200 each normal, nitrous oxide, and ethylene labours, in which nitrous oxide in the newborn prolonged the average bleeding time one minute and the clotting time two minutes, while ethylene prolonged the average bleeding time two minutes and the coagulation time three minutes; but both times were back to normal in nine days (Sanford).

It is not surprising that internal hysterograms should show that ether and chloroform have an inhibiting effect on uterine contractions and that gas anaesthetics are more inclined to increase than decrease uterine contractions, while at the same time affording more definite and controllable pain relief and oxygenation. Even in the presence of eclampsia, toxaemia, nephritis, and cardiac decompensation the gas anaesthetics add the least burden to an already embarrassed mother and unborn babe. Gas-oxygen anaesthesia eliminates subinvolution and secondary haemorrhage as well as delayed inanition (C. P. Rucker).

Of course, there is a time limit (usually two hours) beyond which no anaesthetic, even nitrous oxide, in clinical use may be relied on to maintain blood pressures; although in surface surgery in an otherwise healthy person the blood pressure levels may hold up well for three and four hours under the gas anaesthetics. Anoxaemia causes a rise of pressures; acapnia a fall. If nitrous oxide can be given without fluctuations in control, even the pulse is inclined to maintain its rate. With ethylene and acetylene the blood pressures and pulse rate may fall very slightly after surgical narcosis has been attained, and then remains stabilized for long periods, unless there is operative trauma, haemorrhage, or some systemic or pathological condition leading to shock. Under ordinary conditions the gas anaesthetics do not show the gradual circulatory depression that usually accompanies ether, chloroform, and ethyl chloride anaesthesia; and in the presence of shock, gas-oxygen anaesthesia has within itself and the technique of its administration remedial measures of incalculable efficiency (E. I. McKesson, John S. Lundy).

Apart from propylene and the higher members of the series, the other routine gas anaesthetics do not seem to have any specific effect on the heart so far as electrocardiographic studies show; and the gas anaesthetics have the least possible effect in exaggerating existing cardiac lesions during their administration. Various heart complications may occur under all anaesthetics (tachycardia, bradycardia, blocks of different kinds, myocardial failure, fibrillation), but such complications are certainly no more numerous under gas anaesthetics used for the worst risk cases than under ether, chloroform, and ethyl chloride, or the fact would be strikingly reflected in the anaesthetic death rates. Some have attempted to label the gas anaesthetics as especially dangerous for hysterectomy; and yet of a series of 11 fibroid cases only 2 died under anaesthesia, while 9 died tragic cardiac deaths while up and about or in bed awaiting operation. Myocardial degenerations and profound anaemias hold out an extra hazard of risk under all forms of anaesthesia; they are difficult to evaluate as to their reserve vitality, and their warning signs of danger are all too insignificant even to the expert anaesthetist. They account for many anaesthesia tragedies, and under gas-oxygen anaesthesia the mistake is usually made of expecting them to provide colour and blood pressure reactions which patients with these complications are unable to give.

The actual effects of various anaesthetics on the gastro-intestinal tract may offer a clue to the comparative incidence of nausea and vomiting after anaesthesia, apart from any other factors involved. During the surgical stage of anaesthesia with ether or chloroform there is marked loss of tonus and almost complete inhibition of both rhythmic and peristaltic contractions in the stomach, small intestine, and colon. During the recovery period the stomach continues to show some degree of depression for an hour or longer. The small intestine and colon recover more rapidly after stopping the anaesthetic and show increased activity. The small intestine develops exaggerated peristalsis, while the colon shows a marked increase in tonicity.

The relatively light surgical anaesthesia maintained with ethylene-oxygen causes no marked change in the activity of the gastro-intestinal tract. A slight increase in tonicity and amplitude of contraction has sometimes been observed. During the post-anaesthetic period also there is no marked change in muscular activity. A slight decrease in activity is often observed about an hour after anaesthesia.

Nitrous oxide-oxygen anaesthesia produces a marked increase in the size of contractions of the stomach, ileum, and colon in proportion to the anoxaemia present. On discontinuing the nitrous oxide-oxygen there promptly occurs a very marked inhibition of activity in these three portions of the gastro-intestinal tract; tone is lowered, peristalsis ceases, and segmental contractions are much diminished. This depression will usually last one hour or longer.

The effects of general anaesthesia on a denervated loop of ileum do not differ essentially from those observed on a loop with intact nerve supply, showing that the effects produced are due chiefly to an action on intrinsic structures (G. H. Miller).

With this résumé of some of the more basic comparative relations, characteristics, and effects of the gas anaesthetics, in the discussion that is to follow we may pass on to a more detailed consideration of their practical administration as well as their scope and utility in various operative procedures of surgery and the specialties.

ADDENDUM BY E. I. MCKESSON, M.D.

BY request, I shall elaborate Dr. McMechan's paper with regard to the differences in anaesthesia signs between nitrous oxide-oxygen and ethylene-oxygen. There are some outstanding differences between these two agents which should be understood, since a confusion of the signs may lead to embarrassment of the anaesthetist at times. The accompanying table (p. 1112) shows the usual signs indicating light, normal, and deep narcosis with this anaesthetic; a second chart shows the stages and signs of ethylene-oxygen anaesthesia as noted by John S. Lundy.

My experience with ethylene has been gained from the following technique.

Induction has always been by nitrous oxide-oxygen, followed by ethylene-oxygen at any stage of the operation in which it has been considered desirable. But in no case is ethylene in my hands used throughout the narcosis. It is usually employed for a few minutes up to half an hour, returning to nitrous oxide-oxygen toward the close of the operation, that as much as possible of the ethylene may be eliminated during the narcosis under nitrous oxide-oxygen.

In major operations and in certain minor cases with complications, the pulse, respiration, blood pressures, tidal respiration, rebreathing, and the percentage of oxygen administered are all determined at frequent intervals and charted in a graphic manner. This is done routinely regardless of the anaesthetic employed. With this information at hand in a considerable number of cases it is rather easy to note the relative effects of the two anaesthetics.

Ethylene resembles ether in many of its effects. It also resembles nitrous oxide in speed and is less irritating to the respiratory tract than ether, but more so than nitrous oxide. Hence it rarely induces a flow of mucus such as ether, but there is more moisture than with nitrous oxide. When ethylene is turned on after an induction with nitrous oxide-oxygen the patient almost never coughs, so that the sequence is easier and smoother than the nitrous oxide-oxygen-ether sequence.

The vomiting reflex with nitrous oxide in about 80 per cent. of cases in which it is a sign is due to deep anaesthesia and is corrected by increasing the percentage of oxygen in the mixture. Ethylene resembles ether in this, and blanching, swallowing, retching, and vomiting are usually due to light anaesthesia, which is corrected by increasing the ethylene percentage. Occasionally this complication prevents the substitution with nitrous oxide-oxygen at the close of the operation, which is an undesirable characteristic of ethylene. Vomiting is not always due to light anaesthesia with ethylene, since a case

when expressed in volumes per cent., is the same for all anaesthetic gases. This concept is quite applicable to the newer gas anaesthetics under discussion, because their differential variables in (1) concentration in the inspired air, blood, and tissues; (2) solubility in plasma and lipoids; (3) rates of diffusion; and (4) partial pressures during administration, all tend towards establishing a unity of effect in a proportional ratio of the determining factors involved.

Saturation and Elimination.

In rapidity of saturation for anaesthesia and elimination for recovery, the newer gas anaesthetics conform to the same physico-chemical characteristics and sequence of gradients that determine their potency and toxicity. While nitrous oxide and ethylene, as would be expected, achieve their saturation and elimination more quickly than acetylene, even its rapidity of action is quite remarkable in comparison with that of ether and chloroform. Thus an 88 per cent. saturation of the blood occurs in the first five minutes of anaesthesia, and a complete saturation in seventeen minutes. In one minute after discontinuing administration 85 per cent. of the acetylene has been eliminated, and practically every trace has disappeared in from twenty to thirty minutes.

The patient's own carbon dioxide by rebreathing, or a carbon dioxide-oxygen (5 to 95 per cent.) mixture, may be used with due discretion to speed up both effects through stimulation of the respiratory function. Higher carbon dioxide-oxygen mixtures (30 to 70 per cent.) are being used to bring ether induction, saturation, and elimination within the purview of gas-oxygen anaesthesia; and some anaesthetists are using spurts of 100 per cent. carbon dioxide for emergency stimulation. While this sort of thing may not involve too great a hazard with etherization, it has decided limitations and as yet uncharted dangers in connexion with gas-oxygen anaesthesia. Carbon dioxide has anaesthetic properties, and when used with nitrous oxide or the hydrocarbons in more than normal volumes both gases tend to displace oxygen, and they project the patient and anaesthetist into the unfathomed realms of three-gases physiology.

The rapidity of saturation and elimination of gas anaesthetics accomplish many important and valuable clinical results:

1. The actual duration of anaesthesia is very appreciably shortened in comparison with other methods.
2. Surgical relaxation may be more quickly secured (by secondary saturation or synergists) when desired; and as readily dissipated when no longer needed.
3. Recovery of consciousness and rational control are almost immediate, even after prolonged administration.
4. Bodily functions are scarcely interfered with, and pathological conditions are not aggravated.
5. By-effects of anaesthetic "hang-over" (headache, nausea, vomiting) are avoided or minimized.
6. Thirst may be quenched and nourishment taken very shortly after operation.
7. Anaesthesia may be repeated several times at brief intervals, or oftener at longer intervals.
8. The danger signs of overdose, oxygen want, or carbon dioxide depletion are conspicuous enough to give timely warning, and the leeway for resuscitation in emergencies is fairly wide. The heart is inclined to "carry on" after breathing becomes embarrassed or stopped, and the respiratory centre remains so responsive that often a moment or two of diffusion elimination by withdrawing the anaesthetic, or a few breaths of oxygen under pressure, or brief artificial respiration, suffice to restore vital functions.

Clinically nitrous oxide has been repeated for painful dressings on the same patient every day for more than a month without harmful effects. Ethylene is almost as innocuous. In a series of 1,000 acetylene cases 111 were anaesthetized twice; 45 three times; 6 four times; 3 five times; 2 six times; and 1 seven times within short intervals, often on the same or the next day, with apparently no extra hazard from the repetition (Sollbach).

Experimentally white rats, anaesthetized with propylene every day or so during a period of three or four months, have shown average growth, continued good health, and on being returned to their cages have borne litters of normal young. It is difficult to conceive of any form of anaesthesia that would have less harmful biological effects than are indicated by these results with the gas anaesthetics (Lloyd K. Riggs).

In passing it might be mentioned that if gas anaesthetics could be given in pressure chambers under one-sixth of an added atmosphere, gas-oxygen anaesthesia would not only be surgically ideal, but also practically foolproof so far as safety is concerned. It has been shown that otherwise lethal doses of even propylene will not kill experimental animals in the pressure chamber in the presence of atmospheric volumes of oxygen (20 per cent.) (Paul Bert, Leonard Hill, J. T. Halsey).

Spectroscopic examinations of the blood under nitrous oxide, ethylene, acetylene, and propylene anaesthesia disclose no bands that would indicate any combination with haemoglobin. Suspicions of such a possible combination aroused by peculiar colour changes of the skin and blood may indicate specific effects of the gas anaesthetics themselves, or may indicate the presence of impurities (nitric oxide, carbon monoxide); or synergists (acetone, ether). Apparently the gas anaesthetics are merely in physical solution in the blood, and in addition are in some sort of transient solubility or diffusion in the lipoids.

Bodily Functions.

With ether and chloroform anaesthesia there is an immediate and marked lowering of the blood *p*H, leading to a condition of uncompensated alkali deficit. This may occur independently of respiratory variations, and may go on to profound acidosis (coma) if saturation is excessive and elimination delayed. Nitrous oxide-oxygen anaesthesia leads to an initial alkalaemia, followed by a tendency towards an acidaemia; an acapnial *plus* an anoxic anoxaemia effect. Ethylene-oxygen with anoxaemia present gives the same results as nitrous oxide-oxygen; while ethylene-oxygen without anoxaemia causes a gradual lowering of the blood *p*H, but not beyond normal limits after forty minutes of anaesthesia. Acetylene-oxygen shows a slight tendency to acidosis if any anoxaemia is present, but its development is not nearly so rapid or marked as with ether, chloroform, or ethyl chloride. Similarly the blood *p*H under propylene remains within normal limits provided oxygen need is fully met and carbon dioxide depletion is avoided. This again stresses the vital importance of maximum oxygen percentage and controlled rebreathing in gas-oxygen anaesthesia.

Ether and chloroform produce a decided hyperglycaemia during anaesthesia, presumably by inhibiting the internal secretion of the pancreas and disturbing the glycogen function of the liver. Carbohydrate metabolism is thus perverted and a delayed form of acidosis (ketosis) results, which comes on in twenty-four to forty-eight hours after operation and accounts for much of the morbidity and mortality following these anaesthetics. Under nitrous oxide or ethylene-oxygen and the other gas anaesthetics there is an immediate but very mild hyperglycaemia and some formation of ketone bodies; but the entire disturbance of carbohydrate metabolism is of a very transient sort. Properly given the gas anaesthetics tend to increase or stabilize rather than decrease the carbon dioxide combining power of the blood (C. D. Leake).

Ether and chloroform anaesthesia, if at all deep and prolonged, readily lead to oliguria or anuria, especially in the presence of nephropathy or a tendency to kidney dysfunction, on account of the ketosis and the depression of the circulation they produce. On the contrary, the gas anaesthetics are so slightly irritant chemically, pervert acid-base equilibrium so little, and sustain blood pressure so well, that even their prolonged use in the presence of nephropathy does not materially affect kidney function.

There is some complaint that gas anaesthetics increase haemorrhage, especially oozing from raw surfaces. It is difficult to account for this effect from any physico-chemical action of the gas anaesthetics on the blood stream, its constituents, or the circulation. In view of the fact that excess of oxygen and carbon dioxide both hastens clotting and reduces bleeding time, this objectionable feature complained of by some may actually result from the sort of gas-oxygen administration that steers a devious and vacillating course between the extremes of toxaemia

is now and then encountered in which this sign is corrected by increasing the oxygen percentage.

Ethylene usually resembles ether in its effects upon respiration; it slows the respiration progressively and reduces the tidal respiration as the narcosis is deepened, until it becomes inefficient and stops. Nitrous oxide usually increases the rate and amplitude of respiration as narcosis is deepened until a clean-cut sharp crisis occurs in deep narcosis which is followed by slow, more or less inefficient respiration and apnoea.

The sudden change or crisis is less frequently seen in ethylene, and for this reason is not as safe as nitrous oxide in the hands of the inexperienced. On the other hand, ethylene, in a small percentage of cases, causes rapid instead of slow respiration, and in these cases it does not appear to be as suitable for the patient as nitrous oxide. In changing from nitrous oxide-oxygen to ethylene-oxygen we should expect the respirations to become slower, more regular, and smaller, and it is for this purpose that it is used in some of my cases. If it fails to accomplish this result it is usually turned off.

When producing a *slow* "secondary saturation" with ethylene-oxygen, if respiration ceases more time is required to resuscitate with oxygen forced into the lungs, which is a disadvantage as compared with nitrous oxide. Perhaps this is due to the more complete fixation of this gas by the lipoids, or it may be caused by the slower circulation in removing the excess of gas from the tissues; finally, some impurity such as carbon monoxide in the gas may be responsible. This peculiarity, however, is not of such magnitude as to prevent its use in producing deep narcosis, providing an apparatus is employed that is dependable for artificial respiration with oxygen by the inflation method.

Ethylene-oxygen in about half of the cases produces a slower pulse by about ten beats a minute than nitrous oxide-oxygen. Sometimes the slowing amounts to a bradycardia. Those cases with a slow pulse seem to do best under its influence. In other cases the pulse rate increases over that of nitrous oxide-oxygen, and these often show a marked fall in blood pressures, resembling shock. In the bradycardia cases the blood pressures may fall somewhat, but not out of proportion unless the blood is being overdosed, which may be quickly determined by a few breaths of oxygen of higher percentage.

The blood pressures under nitrous oxide-oxygen are variable with the depth of anaesthesia, trauma, blood loss, etc., but under normal conditions tend to remain within normal limits. The usual result of ethylene-oxygen is a fall in blood pressure similar to ether after the stage of induction. Time will not permit a full discussion of pulse-blood pressure ratios.

The eye signs, particularly the pupil, are more sluggish and unreliable under ethylene than with nitrous oxide-oxygen. However, deep narcosis usually causes a dilatation of the iris. But when it occurs it is not as promptly remedied by the administration of oxygen as it is after nitrous oxide-oxygen. There is less oscillation of the globes with ethylene.

Ethylene is often used to secure a greater degree of muscular relaxation. While this is usually easier to secure with it than with nitrous oxide-oxygen, cases are not infrequently seen in which nitrous oxide-oxygen is better. When high concentrations of ethylene are necessary to secure relaxation, anoxaemia frequently prevents it, and in these cases recourse may be had to nitrous oxide or other procedures, such as premedication or ether. My use of ether for this purpose is indeed rare. In 1925 ether was not used in a single case. This year it has been used in five or six cases for various reasons.

Ethylene, like nitrous oxide, co-ordinates well with morphine-hyoscine premedication. Occasionally atropine is administered during the narcosis for bradycardia, but never as a routine. We use from 1/6 to 1/3 grain of morphine, usually 1/4 grain in adults, and never more than 1/100 grain of hyoscine.

Cyanosis of some degree is not infrequent in the use of nitrous oxide-oxygen. This is most marked in the early minutes of narcosis while saturation is in process. Later in the narcosis, cyanosis is usually absent or of slight degree. Cyanosis is not a sign of anaesthesia, hence it cannot be relied upon. In ethylene-oxygen anaesthesia cyanosis is not as frequently seen, nor is it the pure cyanosis of anoxaemia seen in nitrous oxide anaesthesia, but an *ashy hue* associated with a more precarious state of the patient when it occurs.

Blanching or paleness with ethylene is usually due to nausea. Whether the colour of the blood and skin in ethylene anaesthesia is lighter, due to some action upon the haemoglobin or to a greater decrease in general metabolism or to some impurity or contamination of the gas such as carbon monoxide, is not yet established. But it may be due to all three or any one of the three in a given case. For myself, I prefer to use ethylene, not as a routine, but on indication for some desired pharmacological action, the same as one would employ morphine, hyoscine, atropine, digitalis, ether, etc., relying upon nitrous oxide-oxygen as the basic anaesthetic.

It appears from the signs that ethylene is more depressing and powerful generally than nitrous oxide.

II.—E. I. McKESSON, M.D.,
Toledo, Ohio, U.S.A.

Some Physical Factors in the Administration of Gaseous Anaesthetics.

A discussion of this subject may be warranted by the fact that modern anaesthesia is a mechanical application of many of the laws of physiology, physics, and chemistry. An appreciation of the purposes and mechanism of anaesthesia as well as an understanding of the problems of administration comprises about half of the science of anaesthetics, while much of the art may be credited to the apparatus with which to meet the problems in technique and to accomplish these purposes.

In every nitrous oxide-oxygen or ethylene-oxygen anaesthetic the anaesthetist must apply certain, if not all, of those basic principles of administration through which the science and art have evolved up to the present time. A discussion of these factors, therefore, may be helpful in a field not too well understood.

Mechanism of Anaesthesia.

The anaesthetist alters the gaseous content of the tissues to effect a reduction of oxidation or metabolism in certain of the more highly specialized nervous tissue without similarly affecting the metabolism of other tissues. This is probably the result, mainly, of a singular combination of (1) solubilities of gases in the body fluids, (2) the difference in oxygen requirements of the several tissues, (3) together with an absence of chemical change of the anaesthetic gas while in the body. The solubilities and oxygen requirements are of paramount importance to the anaesthetist.

Solubility of Gases in Body Fluids.

When one considers the transport of gases from the lungs to the tissue cells, or particularly the nuclei, he thinks first of the blood and the carrying power of haemoglobin for oxygen. However, the haemoglobin goes only part way, since it does not actually come into contact with cells outside the blood vessels. And although whole blood carries from 18.5 to 20 volumes per cent. of oxygen, the brain cell, for example, must obtain its oxygen through the plasma, lymph, and finally the cell juices within its own membrane, quite separate from the haemoglobin. Since the plasma carries but 0.24 per cent. O_2 normally,[1] the brain cell must live in a solution containing not more, but undoubtedly less, than this percentage. The haemoglobin, therefore, acts as a store of highly concentrated oxygen, which is liberated or dissociated from the haemoglobin as the tension of oxygen is reduced in the fluids bathing the cell and the red corpuscle. This is an important point for the anaesthetist to keep in mind if he is to visualize what probably takes place in narcosis. The plasma also carries 1.7 per cent. of nitrogen derived from the air inhaled. It is not metabolized as is oxygen.

NITROUS OXIDE-OXYGEN SIGN CHART.—E. I. McKESSON.

LIGHT ANAESTHESIA.

Due to too much oxygen in the mixture.

RESPIRATION.
(*a*) Superficial slow breathing usually regular.
(*b*) Prolonged inspiration.
(*c*) Phonation due to reflexes or pain.
(*d*) Holding breath, grunting.

MUSCULAR PHENOMENA.
(*a*) Movements or rigid muscles.
(*b*) Facial expression of pain or consciousness.
(*c*) Nausea, very rarely.
(*d*) Reflex, or voluntary resistance.

THE EYE.
(*a*) Pupils large, contract to light actively.
(*b*) Conjunctive sensitive.
(*c*) Eyeballs roll.
(*d*) Eyelids resist opening, winks when touched.

COLOUR IN SKIN.
(*a*) Pink or no change normally.
(*b*) In anaemics, no colour change.
(*c*) In plethorics, slight cyanosis.

Remedy.
Decrease the percentage of oxygen in the mixture.

NORMAL ANAESTHESIA.

Due to a properly balanced mixture of N_2O+O_2.

RESPIRATION.
(*a*) *Full "machine-like" respirations. Regular and faster than normal.*
(*b*) *Inspiration and expiration nearly equal.*
(*c*) *No phonation.*
(*d*) *Continuous uninterrupted respiration.*

MUSCULAR PHENOMENA.
(*a*) *Immobile and relaxed, but having normal muscular tonus.*
(*b*) *Expression of normal sleep.*
(*c*) *Quiet.*
(*d*) *Quiet. Relaxed.*

THE EYE.
(*a*) *Pupils small or medium fixed.*
(*b*) *Conjunctive insensitive to touch.*
(*c*) *Eyeballs fixed or slowly roll.*
(*d*) *Lids often slightly open, relaxed, no winking.*

COLOUR IN SKIN.
(*a*) *Varies from pink to decided cyanotic tint.*
(*b*) *In anaemics, no colour change.*
(*c*) *In plethorics, considerable cyanosis.*

PROFOUND ANAESTHESIA

Due to too much N_2O+O_2 in the mixture or to partial obstruction of respiratory passages.

RESPIRATION.
(*a*) Irregular rhythm (sobby) usually slower than normal. Spasmodic.
(*b*) Prolonged expiration.
(*c*) Phonation due to muscular spasm of vocal cords. Often crowing.
(*d*) Cessation of respiration from spasm of muscles of exhalation.

MUSCULAR PHENOMENA.
(*a*) Clonic movements, twitching or jerking in early minutes of induction, often start in upper eyelids.
(*b*) Expression wild looking.
(*c*) Swallowing, retching or vomiting common.
(*d*) Tetanic, spasm, marked rigidity, opisthotonos in some cases.

THE EYE.
(*a*) Pupils fixed, enlarge progressively and finally become irregular in shape.
(*b*) Conjunctive insensitive.
(*c*) Eyeballs fixed in some position or roll.
(*d*) Eyelids stiff. Often wide open.

COLOUR IN SKIN.
(*a*) Usually cyanotic.
(*b*) In anaemics, slight flushing, rarely cyanosis.
(*c*) In plethorics, almost black.

Remedy.
Increase oxygen in the mixture or inflate lungs with pure oxygen 1 to 3 times.

SIGNS OF ANAESTHESIA WITH ETHYLENE AND OXYGEN.—JOHN S. LUNDY.

A. WITHOUT MORPHINE.

First stage (40 to 60 seconds) 90 per cent. C_2H_4+10 per cent. O_2.
1. Pupil normal, occasionally a sudden fleeting dilatation. Reacts quickly to light.
2. Skin pink.
3. Relaxation absent.
4. Eyeball moving freely.
5. Temperature of skin unchanged.
6. Humidity of skin unchanged.
7. Pulse rate often increased.
8. Blood pressure often about 20 mm. high or low.
9. Respiration voluntarily normal.
10. Blood pink.

Second stage (light surgical anaesthesia, occasionally a period of excitement) 2 to 5 minutes, 85 per cent. C_2H_4+15 per cent. O_2.
1. Pupil normal or slightly dilated. Reacts quickly to light.
2. Skin pink.
3. Relaxation moderate.
4. Eyeball moving.
5. Temperature of skin normal.
6. Skin dry.
7. Pulse rate usually normal.
8. Blood pressure usually normal.
9. Respiration deeper and faster.
10. Blood red.

Third stage (deep surgical anaesthesia) 5 to 15 minutes, 80 per cent. C_2H_4+20 per cent. O_2.
1. Pupil slightly dilated. Reacts to light.
2. Skin pink.
3. Relaxation good.
4. Eyeball fixed, often turned and fixed.
5. Skin warm.
6. Skin dry.
7. Pulse rate normal or slowed.
8. Blood pressure normal or lowered.
9. Respiration normal as in sleep.
10. Blood pink.

B. WITH MORPHINE.

First stage (25 to 50 seconds) 85 per cent. C_2H_4+15 per cent. O_2.
1. Pupil contracted. Reacts quickly to light.
2. Skin pink.
3. Relaxation slight or absent.
4. Eyeball moving freely.
5. Temperature of skin unchanged.
6. Humidity of skin unchanged.
7. Pulse rate normal.
8. Blood pressure normal.
9. Respiration voluntarily normal.
10. Blood pink.

Second stage (light surgical anaesthesia, usually no excitement) 2 to 3 minutes, 80 per cent. C_2H_4+20 per cent. O_2.
1. Pupil contracted. Reacts to light.
2. Skin pink.
3. Relaxation moderate.
4. Eyeball moving slowly.
5. Skin normal.
6. Skin dry.
7. Pulse rate slightly increased.
8. Blood pressure normal or slightly lowered.
9. Respiration faster.
10. Blood red.

Third stage (deep surgical anaesthesia) 3 to 10 minutes, 75 per cent. C_2H_4+25 per cent. O_2.
1. Pupil normal. Reacts slowly to light.
2. Skin pink.
3. Relaxation very good.
4. Eyeball fixed, may be turned and fixed.
5. Skin warm.
6. Skin dry.
7. Pulse rate normal or slowed.
8. Blood pressure normal or lowered.
9. Respiration normal as in sleep.
10. Blood pink.

Fourth stage. Pre-mortem (at any time) 97 per cent. C_2H_4+3 per cent. O_2.
1. Pupil dilated. Does not react to light. 2. Skin blue, black, and finally grey.
3. Relaxation complete. 4. Eyeball fixed. 5. Skin cold.
6. Skin moist. 7. Pulse rate fast, irregular and faint. 8. Blood pressure very low.
9. Respiration shallow, irregular and inhibited. 10. Blood black.

The Continuous Flow Appliances.

Twenty years ago it was thought by some anaesthetists that the best way to produce and maintain the mixture for clinical work was to flow the two gases together continuously and uniformly, varying the proportions usually by adjusting the flow rate of the oxygen. This, however, failed at once, since the nitrous oxide tank valve could not be made to deliver this gas uniformly because of freezing, and also because of a progressive fall of pressure in the tank as it was used. Likewise the oxygen varied, although in practice it did not freeze. To overcome this difficulty, a few years later a pressure-reducing valve or regulator was interposed between the tank and mixing apparatus proper, so that the falling pressure in the tank might not so greatly influence the delivery rate. This marked some advance in the evolution of the anaesthetic, but was not completely successful because, however carefully the regulator had been constructed, it was still subject to relatively large variations of pressure and delivery rate when applied to gases for this purpose. Moreover, the very small apertures through which the gases were delivered often became more or less obstructed by small particles of water, ice, or foreign matter, or by changes in temperature, and the mixtures varied accordingly between limits quite incompatible with smooth narcosis.

It seemed that the system followed until that time (sixteen years ago) could not be made sufficiently dependable to warrant the use of nitrous oxide-oxygen for all operations unless some more practical instrument for mixing were devised.

The Intermittent Flow Method.

After considerable clinical experience with various forms of mixing apparatus then available, I experimented along another line. The mechanical problem presented many difficulties, but it appeared that if the nitrous oxide and the oxygen bags could be kept equally filled or under equal but very low pressure by some automatic bag-filling mechanism, progress might be made. After several trials, such valves were perfected which automatically replenished the oxygen and the nitrous oxide bags at each breath—stopping the flow from the tanks into the bags while the patient exhaled and paused between breaths. The bags were thus kept equally filled with their respective gases, regardless of the rate or volume of respirations.

Rubber bags are not of uniform thickness or weight, however carefully made; hence the two bags were placed together in a sack of fish net so that any, even very slight, differences of pressure of the two gases within the bags would be equalized by their walls pressing against each other. The pressure in the two bags was then always equal, regardless of what that pressure might have been.

Instead of a continuous flow apparatus this became an intermittent flow device. Certain advantages, however, resulted, among which were a foundation for proper mixture control and relief from attempts at manually adjusting the rate of flow, since the respirations regulated this function much better than the anaesthetist had done before. The possible range of automatic gas delivery was enormous—from nothing to more than 33 gallons a minute, so that no patient could exhaust the supply, however rapidly he breathed. The intermittent flow principle also adapted itself to the technique for intermittent administration in producing analgesia for obstetrics.

Hewett's two bags having a common rubber partition was probably not an attempt to equalize pressures, as there is no such purpose found in the literature, and they certainly could not have so functioned. Levy's[5] recent plan of putting a small oxygen bag within the nitrous oxide bag could have been effective in a limited way had it been possible to see when it was empty or how much oxygen to add to refill it properly.

With the two gases in separate bags but kept at equal pressures the first factor in producing the desired mixture was then satisfied and the construction of a suitable mixing valve mechanism was undertaken. It was necessary in constructing the mixing mechanism to prevent any backward flow of mixed gases into either of the two supply bags during exhalations as well as any flow of gas from one bag into the other. This was accomplished by two check valves placed over the outlets from these bags. It was also necessary that these check valves should open simultaneously; this was at first accomplished by fastening the check valves or discs together by means of arms on a shaft. Later, a single check or disc accomplished the same purpose when the two outlets were brought closer together. Between the bags and the check valves two plug valves were disposed—one for nitrous oxide, the other for oxygen—with rectangular openings piercing each and graduations on their heads indicating the degree of opening. Later these two valves were combined in one, since it was more convenient and accurate to adjust one valve than two.

The areas of the mixing ports were each made equal to the cross-section of the adult trachea, so that the velocity of gas through either or both of these ports was the same as that in the trachea. This latter type of mixing valve was provided with a partition, while the single check valve referred to closed the communication between the bags. When the latter was lifted during inhalations it uncovered the exits from the two bags through which the two gases passed in those proportions for which the mixing ports had been set. On top of this mixing valve was a graduated dial, indicating the degree of opening of each port. By turning this valve to one point nitrous oxide only was obtained, at another point pure oxygen was delivered, while at the several graduations between these two points any desired mixture was available. This was a convenient arrangement in practice, since this single adjustment regulated the mixture with the least possible effort and in the shortest time. Another section of the dial was graduated for mixtures of air and nitrous oxide, sometimes used in producing analgesia.

The mixed gas was conducted to the inhalers through a wide-bore flexible and non-collapsible rubber tube, making for easy inhalation. Between the mixing valve and the lungs was a volume of mixed gas equal to about two breaths, so that after the mixing valve had been set for any new proportion the effects of this new mixture were observed by the corresponding change in depth of anaesthesia about seven seconds later. This feature meant easier and more immediate control of the narcosis than was afforded when a large mass of mixed gas had to be converted into some new mixture.

Owing to the large size of the mixing ports, the differences in density between nitrous oxide and oxygen or between ethylene and oxygen did not introduce appreciable errors from their actions in accordance with Graham's law, nor did they permit small particles of foreign matter appreciably to obstruct or restrict the flow of gases from the two bags so as to affect the mixture. With the large bags as the immediate source of the supply of gases for mixing, the temperatures were practically equal, minimizing the effects of disturbances from their action in accordance with Boyle's law.

With that combination of elements a mixing mechanism resulted which was extremely sensitive and convenient for clinical work, not only in producing but also in maintaining the desired proportions for an indefinite period. The slightest change in position of the mixing valve alone resulted in a prompt and corresponding change in the depth of anaesthesia. It was responsive to less than 1 per cent., and hence met the preciseness of body demands by an equal accuracy of mixture control.

In addition to the advantages resulting from the intermittent flow principle enumerated, still another unexpected one followed. Whereas freezing of the nitrous oxide either at the tank valve or the regulator nozzle had been a common difficulty in continuous flow appliances, the opening and closing of the valves in synchronism with respiration under the intermittent flow principle caused the ice to be fractured and crushed with each breath, ensuring an adequate delivery of this gas into the bag under ordinary conditions. It also reduced the waste of gases, and thus further lessened the refrigeration in the regulator. Hence artificial heat by means of lamps, electric warmers, etc., was not required, except occasionally in slow tonsil operations, when a rubber bottle filled with hot water placed on the regulator sufficed.

With this apparatus the head of pressure back of the automatic bag-filling valves might fluctuate widely without

The amount of a gas which a liquid will absorb depends upon the character of the gas as well as the liquid and its temperature. Although we breathe about 80 per cent. nitrogen in the air, only 1.7 per cent. is dissolved in the plasma; likewise, we inhale almost 20 per cent. O_2, yet the blood plasma dissolves only 0.24 per cent. The brain cell obtains its oxygen from a liquid where the ratio of N_2 and O_2 is roughly as 7:1. Carbon dioxide also plays an important role, but it will be disregarded for the present.

"From the standpoint of physical chemistry the partial pressure of a gas in solution is simply the vapour pressure of the dissolved gas."[1] When nitrous oxide is inhaled it diffuses as if the whole body were a liquid in which it was soluble up to a certain tension. Hence it is not so remarkable that more than one litre a minute of this gas is absorbed upon induction. Paul Bert fixed the solubility of nitrous oxide in blood as 45 volumes per cent. This was *in vitro*. Greene[2] has shown that, *in vivo*, anaesthesia is secured in the dog when 26 volumes per cent. are dissolved; that is to say, nitrous oxide is fifteen times more soluble than nitrogen and one hundred times greater than oxygen in the blood plasma, since there is no proof that this gas is carried by the haemoglobin in chemical combination. The ratio of seven molecules of N_2 to one molecule of O_2 is compatible with normal physiology, but when one hundred molecules of N_2O to one of O_2 are present anaesthesia results.

Oxygen Requirements for Different Tissues.

Anaesthesia, then, may be due to the dilution or dispersion of the O_2 molecules so that certain cells are unable to find enough oxygen with which to maintain metabolism or chemical activity up to the usual rate; that is, oxygen want or anoxaemia may interrupt such functions as depend upon a maximum oxygen supply. In support of this view the researches of Taschiro[3] show that nervous tissue metabolizes more rapidly, therefore requires a more liberal supply of oxygen molecules, than other tissues. G. H. Parker's[4] investigation of metabolism of dogfish nerve also substantiates certain of Taschiro's findings in this particular.

Upon these grounds it may be assumed that at certain tensions of N_2O and O_2 in the body juices the activity of certain nerve cells is curtailed, while other cells, such as those of muscle and the more ancient and stable nerve tissue, may find sufficient oxygen for their usual functions unabridged.

Now since the amount of gases which a given volume of liquid will carry in simple solution depends with other things upon the proportions or tensions of these gases in contact with the liquid, the mixture of gases inhaled is the most important determining factor of the tensions of these gases held in solution. Hence the tensions or proportions of the inhaled gases determine the depth of anaesthesia.

Since nitrogen is less soluble than nitrous oxide, it interferes with the production of anaesthesia and must therefore be excluded as far as possible from the gases inhaled. The first requisite to nitrous oxide-oxygen anaesthesia is the exclusion of air. The second is the production and maintenance of the proper proportions of nitrous oxide and oxygen. The variation in mixture compatible with deep anaesthesia is very small indeed. Often as little as 1 per cent. perceptibly alters the depth of narcosis.

Within narrow limits, the chemical adjustments of the patient are extremely flexible, producing certain signs by which the anaesthetist may be guided in the adjustment of the various mechanical elements of control. So important are these mechanical factors in this form of anaesthesia that the best qualified anaesthetist is unable to overcome some of the handicaps of a faulty apparatus and at the same time secure the best results. On the other hand, the tyro with his limited knowledge is unable to utilize fully the factors of control which may be embodied in a well designed instrument.

It is the purpose now to discuss the physical problems of administration which confront every anaesthetist, and to review briefly some of the mechanical methods which have been devised to assist him.

Functions of the Apparatus.

There are four outstanding functions for an anaesthetizing apparatus. The first of these comprises suitable inhalers, connexions, valves, etc., for the exclusion of air. The second embodies positive control of the mixture of gases to be administered. The third is represented in the control of the pressure of mixed gases in the inhaler. The fourth is the regulation of rebreathing. A fifth might be added as an accessory of great clinical importance—namely, a mechanism for artificial respiration by inflating the lungs with oxygen.

Mixture Regulation.

The depth of anaesthesia is controlled by the proportion of oxygen and nitrous oxide contained in the mixture, and since this ratio for the ordinary patient is very definite, the means for regulating the mixture was an important problem in the development of this anaesthetic.

Early in the experimental stages some fixed and known mixture was sought by Hewett and others which might produce narcosis. But it was soon learned that no single mixture could be depended upon for all subjects, nor, in fact, for the same patient at different periods in the operation. The necessity of altering the mixture from time to time made some adjustable mixing apparatus essential. The problem therefore became more complicated, and has consumed years of experimentation in reaching its present state of development.

Hewett and others early resorted to rubber bags as containers and a valve between them to proportion the two gases, but owing to the inability of the anaesthetist to keep the two bags equally filled—that is, to maintain equal pressures in the bags by manual control of valves—the mixture varied so widely that a smooth narcosis by this method was often impossible for long periods.

Mixing two gases in proportions sufficiently accurate to maintain narcosis has been a very difficult procedure to carry out over a long period. There are several reasons. First, gases are composed of rapidly moving molecules with a vacuum between them, resulting in a most mobile body. Secondly, owing to this great mobility, and also to the exceedingly rapid absorption of these molecules by the blood, the effect of any change in the proportions of these two kinds of molecules is quickly reflected in the depth of narcosis.

According to Avogadro's law, that equal volumes of gases with the same pressure and temperature contain an equal number of molecules, and since 1 c.cm. of a gas at 0° C. and 760 mm. Hg contains about 27 trillion molecules, relatively slight changes in temperature or pressure of one of the gases produce tremendous changes in the number of molecules in a given volume of the gas. Again, at any stated temperature a given mass of gas varies in volume inversely as the pressure (Boyle's law). Hence great changes in the depth of narcosis follow any rather slight alteration in these physical conditions of either gas as it passes through the mixing device.

When the gases are drawn from their high-pressure containers both the temperature and the pressure vary. In some machines used in administration the pressure has been the greater source of error, in others the temperature variations. So difficult of control and elusive were these gases under slight differences of pressure that many anaesthetists came to the erroneous conclusion that the gases themselves were inefficient for protracted anaesthesia, and therefore ether in sufficient amounts was vaporized into the mixture to complete narcosis. It is now known, however, that the ether thus administered largely functioned either by compensating for the errors of fluctuations in the mixture or by becoming the dominant agent. But it has been demonstrated in practice for several years past that nitrous oxide-oxygen may be successfully administered for any operation without ether, if the mixture and certain other factors are properly controlled. Gradually these facts became known, and more serious efforts were made to devise some apparatus which might produce and maintain the desired mixtures.

assist respiration by a little pressure without increasing the consumption of gas or causing unnecessary waste. The method has added much to the success and safety of gaseous anaesthetics. It has improved a large field of surgery involving the respiratory tract which was not only difficult for the surgeon and anaesthetist, but also more dangerous for the patient.

Rebreathing.

Rebreathing was employed in the earliest administrations of nitrous oxide. Then came a period of years when it was not considered safe; this was followed by a revival in the present period, in which it has been employed upon physiological grounds.

When Gatch revived rebreathing in 1910 it was practised as before, by manually filling a large bag with nitrous oxide and oxygen in which the patient breathed to and fro for some minutes; then the contents were exhaled from the apparatus and the bag was refilled with a new charge of gases from the tanks, and the procedure repeated. This method was immediately followed by two other methods—first the continuous flow method in which the nitrous oxide and oxygen flowed continuously into a bag, larger in volume than the tidal respiration, into and out of which the patient respired, expelling gas from the exhaling valve at irregular intervals depending upon the character of breathing.

Fractional Rebreathing.

Following the continuous method which was employed by me for a short time in a modified form, I devised the fractional method in 1910[10] upon the premisses that, if rebreathing was to be employed, it should be done accurately to learn what, if any, advantages might accrue from its use other than the conservation of gases. Accordingly a small cylindrical bag, adjustable in capacity and calibrated in cubic centimetres, was constructed. With it the patient's tidal respiration was actually measured to determine if rebreathing were advisable, and then the bag was readjusted to hold any measured volume of exhalation for re-inhalation at each succeeding inspiration.

A variable measured portion of each inhalation thus consisted of previously exhaled gas, and the balance of inspiration was composed of fresh or previously unused gases from the mixing mechanism. It co-ordinated well with the intermittent flow principle.

With this fractional rebreathing it was soon evident that conservation of gas by rebreathing was of secondary importance and that its real value consisted in controlling more accurately the depth of breathing by the restricted elimination of CO_2. It has afforded the anaesthetist an interesting study of the physiology of respiration under anaesthesia and added a certain finesse of control in correcting respiratory irregularities which has materially aided in the maintenance of deep anaesthesia.

Inhalers and other accessory equipment, although important in adapting gaseous anaesthetics to various operations, will not be discussed, but it is important that a few words should be added regarding oxygen insufflation.

Artificial Respiration with Oxygen.

The rapid action of nitrous oxide or ethylene—for they are administered in essentially the same manner and act much alike as to speed—requires careful watching lest the patient be crowded into apnoea. It was for this reason that I first incorporated a means for inflating the lungs with oxygen to re-establish respiration should it fail or threaten to stop. The mechanism incorporated in the apparatus described consists of a special valve which short-circuits the oxygen bag and delivers the oxygen through the inhaler and directly into the lungs. This arrangement was employed because bags would not withstand the necessary pressure to inflate the lungs under certain conditions. And to put oxygen into the lungs promptly and positively was essential.

It was demonstrated that the human lungs were in no danger of overdistension with oxygen, since the inhaler could not be so held even by force until a pressure of 80 mm. Hg might be developed. The dog's lungs will withstand more than 120 mm. Hg without rupture even with the chest open. Moreover, when properly performed, the oxygen but partly fills the lungs at each inflation, developing little or no pressure therein, and when done at once one or two inflations usually restore the patient to a state of respiration. Hence this method was both effective and perfectly safe, and has proved to be so during many years of clinical use in which many lives have been saved.

When foreign bodies have been inhaled, such as vomited meat, tonsil or blood, gauze or cotton packs, and obstruct or interrupt respiration, a serious situation at once results. With ample oxygen pressure to pass the obstruction and to inflate the lungs, however, one is able to restore the cough reflex in a few moments, which assists in the expulsion of the material from the air passages.[11] Thus the lives of such patients, which were frequently lost by older methods of resuscitation, are now commonly saved by this procedure. Its availability at the moment and under proper control makes oxygen the ideal agent for the purpose—in fact, superior to any other.

CONCLUSIONS.

In conclusion it may be said that the physical factors in the administration of gaseous anaesthetics have been discovered and appliances have been devised for their successful application. The most important of these factors are:

1. Suitable inhalers for excluding air.
2. Regulation of the mixture of gases with means for maintaining any desired mixture.
3. The direct control and maintenance of pressure above that of the atmosphere, when required, without exceeding the safe pressure desired and also without unnecessary waste of gases.
4. Means for measuring the tidal respiration, and estimating the patient's ventilation to determine the need for rebreathing. Also means for rebreathing any desired measured volume of each exhalation.
5. Means for performing artificial respiration with oxygen by inflation as an integral part of the apparatus.

The intermittent flow principle co-ordinates well the above essentials for an anaesthetizing apparatus.

REFERENCES.

[1] Haldane, J. S.: *Respiration*, 1922, p. 67.
[2] Greene, C. W.: *Journ. Amer. Med. Assoc.*, 35, 379, March, 1925.
[3] Taschiro, S.: *A Chemical Sign of Life*, University Chicago Press, 1917.
[4] Parker, G. H.: *Journ. Gen. Physiology*, November 20th, 1925.
[5] Luke and Ross: *Anesthesia in Dental Surgery*, p. 147.
[6] "Safety Apparatus," Chicago, Ill.
[7] Gwathmey, New York.
[8] Heidbrink, Minneapolis, Minn.
[9] Teter, C. K., Cleveland, Ohio.
[10] McKesson, E. I.: *Amer. Journ. Surgery*, January, 1915.
[11] McKesson, E. I.: *Journ. Amer. Med. Assoc.*, vol. 83, p. 1502.

GENERAL DISCUSSION.

Dr. S. R. WILSON (Manchester) said he had not much sympathy with the electro-chemical theory of anaesthesia, but thought the metabolic theory deserving of careful consideration by all those interested in the newer anaesthetics. Hibernating animals showed the Cheyne-Stokes and Biot types of respiration, and there would appear to be a distinct relation between hibernating animals, the trance conditions of Indian fakirs, hypnosis, and anaesthetic conditions. As regards the newer gases, he wished to be sure of their superiority in many ways to nitrous oxide. It was difficult to be sure of the purity of the new gases, and it was necessary to be certain that they were in fact pure. The colour of the blood could not be relied upon to prove the anoxaemic condition of the blood, since ethylene gave similar results to carbon monoxide. Propylene was definitely out of court, and acetylene had the disadvantage of being explosive and difficult of purification. Dr. Wilson agreed with Dr. McKesson as to the desirability of ethylene in the case of the very old, the very young, and diabetics, but asked whether the normal slowing of the pulse with ethylene occurred in cases of exophthalmic goitre, where it would be a distinct advantage.

Dr. L. L. GREENBLUM (Akron, Ohio) emphasized the necessity of co-operation between the surgeon and the anaesthetist.

altering the mixture so long as there was enough pressure to cause the bags to refill before the next breath was taken, since the mixture is made from the bags and not from the regulators direct. In all continuous flow devices the mixture is always altered by any fluctuation of pressure back of the mixing device. In such devices efforts have been made to eliminate any (although slight) tendencies to freezing by the use of heaters, and more recently by drying the gas before compressing it into tanks. Efforts have also been made to construct regulators which might maintain an exact low pressure, but such have not yet been produced.

More recently, particularly in America, further experiments with continuous flow regulation of mixture have been attempted. Without eliminating the errors enumerated before, other sources of inaccuracy have been introduced in passing gases through very small orifices under variable heads of pressure and with other variable back pressures against the outlets of these orifices. One group employed water columns as indicating the head of pressure used to force gas through very small apertures. In one machine of this group,[6] the glass tubes were graduated in percentages. In another[7] they were graduated in the volume flow for each gas in litres per minute. These water type gas meters as produced excluded the successful employment of nitrous oxide-oxygen for certain operations owing to their limited range of delivery rates, and their use led many to the conclusion that nitrous oxide-oxygen might not be employed in certain operations.

Effusion of Gases through Small Orifices.

In passing gases through very small orifices (unobstructed by water, ice, or particles of foreign matter) such as were used in continuous flow mixing devices, at a given temperature and pressure the rate of effusion varies inversely as the square root of their densities (Graham's law). Compared with air, the density of oxygen is 1.105 and the square root is 1.049; the density of nitrous oxide is 1.522, the square root is 1.233. Then since they vary inversely, the oxygen would flow at the rate of 1.233 through an aperture which would deliver but 1.049 of nitrous oxide—a difference of 15 per cent.

In drilling very small holes through metal it is impracticable in manufacturing to reproduce such orifices; hence, if accurate, each meter had to be calibrated individually, which was not done. Furthermore, the thickness of the metal usually varies, which adds a variable error of wall friction to the passage of gases along the sides of the tiny tube. Gas analysis as well as clinical observation showed neither method to be within that range of accuracy necessary for the best work in nitrous oxide-oxygen anaesthesia, nor to afford other desirable features in an apparatus for clinical use. Similarly ethylene has a density of 0.969, and, although the difference would be less, the error was in favour of ethylene instead of oxygen.

In another group[8] spring gauges of the Bourdon type were employed. The oxygen gauge, instead of indicating pressure, was calibrated in percentages. The aperture for the oxygen was exceedingly small (71 drill, or about the size of the hole in a hypodermic needle), hence it was frequently more or less obstructed by foreign matter, so that the gauge indications of percentage were often erroneous. Such gauges are not to be depended on for extreme accuracy for any length of time. The nitrous oxide orifice was larger, but the pressure as indicated by its gauge was to have remained constant. In practice this was rarely possible owing to the variations in tank pressure, freezing, and alterations in the rate of delivery for which the apparatus was adjusted from time to time. In the design of this apparatus it was also assumed that by moving a plate of metal toward and away from these two orifices the rate of delivery of the two gases might be decreased or increased without altering the proportions as previously obtained. In practice and by gas analysis this was found not to be true, but, on the contrary, as the rate of the mixture delivered was increased the proportion of oxygen progressively decreased.

Pressure in the Inhaler.

Until the gases were delivered into the inhaler considerably above atmospheric pressure anaesthesia could not be maintained for prolonged periods with nitrous oxide-oxygen for certain operations, such as the extraction of teeth, plastic mouth surgery, tonsillectomy, nasal operations, tracheotomy, operations upon the larynx, etc., because the patient inhaled too much air through the open air passage during the operation. Many, in fact most, anaesthesias at some period of the operation are also improved by added pressure in the inhaler. Again, operations upon the neck often interfere with breathing unless inspiration is assisted by pressure; this is particularly true in some goitre cases. Then again, in thoracic surgery, pressure often is the factor which determines the success of the operation and the outcome of the patient, since collapse of the lungs may cause immediate death. Pressure also increases the absorption of the gases by the blood according to the laws of the solution of gases.

In order to manage such cases it is not only necessary to have pressure which is variable at the will of the anaesthetist, but at the same time the desired proportions of the gases must be maintained. It was the want of this dual control which, until recent years, precluded the use of nitrous oxide in this large group of cases and often embarrassed the anaesthetist in other cases.

In America Teter[9] successfully managed some of these types of operations by restricting the *exit* of gases from the inhaler while permitting the gases to flow continuously from the tanks into the apparatus. His production of pressure was not at the source but rather at the outlet of the apparatus. His was, therefore, *indirect*, and with any obstruction to the exit of gas through the mouth, such as occurs when the tongue is pushed back by the surgeon, the pressure progressively increased beyond the desired amount. Bags were occasionally ruptured when the supply was not promptly shut off. On the other hand, if the patient began to breathe more rapidly, exhaling through the mouth as in extractions or tonsillectomy, the pressure fell until the patient was able to draw air through the mouth, with the resultant light anaesthesia and occasionally the interruption of the operation. To offset this latter condition it was necessary to increase the rate of flow of the two gases in an effort to maintain the desired pressure. These were constant causes of adjustment and annoyance and a source of uneven narcosis, since the surgeon's necessary manipulations affected the patency of the air passages at frequent intervals. To provide a "blow off" valve to prevent excessive pressure was not permissible because of waste. What applied to Teter's method also applied to all other continuous flow appliances which followed it.

Pressure and flow rate are, therefore, not synonymous, but fundamentally different. Pressure control is the essential factor in these cases. It was recognized that what was needed was some *direct means for simultaneously varying the pressure of both gases* before they were mixed, and thus regulating the pressure itself by automatically varying the rate of flow from the tanks to maintain, but not to exceed, the desired pressure, whether that rate of flow be great or small.

Pressure by the Direct Method.

I tried several methods with his mixing device, such as tightening the net enclosing the bags and adjusting the bag-filling valves so that they distended the bags more tightly, but the desired result was obtained more simply when a spring and adjusting screw was attached to the automatic bag-filling valves. With this spring set at any desired tension (from 0 to 20 mm. Hg) it kept these valves open until the pressure in the two bags was great enough to overcome the spring tension and either to close the valves or decrease the flow of gases, according as the respiratory requirements of the patient might demand. Although the pressures delivered into the inhaler were subject to change by tightening or loosening the spring, the depth of narcosis was not materially disturbed because the pressures in the bags, whether great or small, were always equal.

This direct method for securing the pressure in the inhaler has worked well. The pressure has enabled the amount of gas admitted into the bags to maintain itself. This function is greatly appreciated when it is desired to

Reports of Societies.

GYNAECOLOGICAL TUMOURS.

A MEETING of the North of England Obstetrical and Gynaecological Society was held in Sheffield on November 19th, with the President, Mr. W. GOUGH (Leeds), in the chair.

Miss FRANCES IVENS (Liverpool) showed coloured drawings and histological sections to illustrate a case of melanotic sarcoma of the clitoris. The clinical details were as follows:

A married woman, an 8-para, aged about 58, was ten years past the menopause, of healthy appearance, but very stout. She had had an operation for gall stones some years previously, and complained of haemorrhoids. She had noticed a small lump in the anterior portion of the vulva for about twelve months, but it had given her no pain or inconvenience, nor had it discharged. On examination the clitoris was found to be replaced by a softish nodular growth, pigmented in patches, which extended on to the left labium minus. The prepuce of the clitoris was stretched over the tumour. The growth was movable on the deeper structures. Miss Ivens had operated in April, 1925, excising the whole of the vulva as radically and deeply as possible; no enlargement of the inguinal glands was detected. In addition some large haemorrhoids were removed. Primary union occurred, and so far, eighteen months after the operation, no recurrence had followed. The tumour consisted of masses of spindle cells with well stained nuclei arranged in an alveolar manner in a connective tissue stroma. Granules of brownish pigment were scattered through the connective tissue, and were present in some of the cells, but in some areas pigment was absent. The tumour was covered by thinned-out stratified epithelium.

Miss Ivens said that cases of melanotic sarcoma of the clitoris were very rare. In 1908 Eardley Holland had collected three among thirty-two of the vulva. Since then Lockhart had reported one, and mentioned two others. He noted the extreme malignancy of these tumours and their tendency to rapid dissemination. In the present case favourable points affecting the prognosis were the absence of ulceration and fixation, the absence of enlarged inguinal glands, and, probably, the fact that pigment only occurred in patches. As regards the mode of origin of this tumour, it was possible that it arose from the chromatophores or connective tissue pigment cells of the skin; it was therefore a melanotic sarcoma, and not a sarcoma associated with altered blood pigment or sarcoma haemorrhagica.

Dr. J. E. GEMMELL (Liverpool) said he had had a similar case in which recurrence followed within twelve months.

Dr. W. FLETCHER SHAW (Manchester) also had had a case of a large densely pigmented tumour of the vulva, which he had removed very widely with the inguinal glands, and had treated with radium, but recurrence followed in four months, and the patient died in fourteen months.

Dr. LEITH MURRAY (Liverpool) considered that a small amount of pigment did not necessarily mean a low degree of malignancy.

Ovarian Cysts and Tumours.

Dr. E. O. CROFT (Leeds) then demonstrated a specimen showing axial rotation of a fimbrial cyst. The symptoms were those of twisting of the pedicle of a cyst with pain on the left side. The ovarian pedicle was not twisted, but the cyst had a corkscrew twist. The other ovary was normal and healthy. Professor M. H. PHILLIPS (Sheffield) and Mr. J. ST. G. WILSON (Liverpool) had both encountered similar cases.

Dr. J. W. BRIDE (Manchester) showed an ovarian cyst in a girl aged 15. He said that the cyst was a dermoid which had excited attention by the development of acute abdominal symptoms due to torsion of its pedicle. Persistent vomiting and acute left-sided abdominal pain had followed a menstrual period about a week previously; and there had been regular menstrual periods since the onset of menstruation, but always with dysmenorrhoea. The patient had a pulse of 130 and temperature 101°, great rigidity in the hypogastrium, and inability to pass water. An indefinite mass was felt in the left iliac region. Dr. Bride had diagnosed ovarian cyst with twisted pedicle, and advised immediate operation. He found the cyst, about the size of a foetal head, with numerous fine adhesions, lying in the utero-vesical pouch, and quite black in colour, and he removed it. The right tube and ovary were normal, and the patient made a good recovery.

Dr. Bride also showed a case of fibromata of both ovaries with primary amenorrhoea. He said that this interesting and somewhat unusual specimen had been found by him when investigating a case of primary amenorrhoea in an unmarried girl, aged 19 years, who had consulted him on account of pain in the hypogastrium and feeling a lump there. For her age the patient was distinctly childish; she had never menstruated nor had any molimina. On abdominal examination a hard mass, non-mobile and tender, was felt in the left iliac region, and through the vagina the pelvis was found to be filled with hard nodular growths which he had been unable to separate from the uterus. He had diagnosed ovarian tumour, possibly sarcomatous. On operation he had found the large left and smaller right ovarian tumour, and, being doubtful of their nature and feeling sure that all ovarian tissue was destroyed, he performed panhysterectomy. There was no ascites present, and the patient made a good recovery. Dr. Bride added that Hoon had stated that fibromata might occur at any age after puberty; there might be comparatively few symptoms, ascites did not necessarily mean malignancy, and menstruation was usually normal. The tumours in this case were interesting since they caused primary amenorrhoea, and must have been present for some time. This was supported by the evident calcification of the tumours. The childish condition of the patient at 19 years of age suggested complete absence of the ovarian secretion. Dr. Bride thought that the statement in textbooks that ascites occurred so frequently in connexion with fibromata as to be almost a symptom ought to be modified. He had seen a certain number of fibromata, and in none had ascites been present. The previous case on which he had operated was in a woman aged 76, and the tumour weighed 4 lb. There was no ascites. Pain as a diagnostic point against fibroids was an important symptom here.

The PRESIDENT did not agree that ascites was so stressed as a symptom.

Endometrioma of the Broad Ligament.

Miss IVENS showed also a specimen of an endometrioma which had been removed from between the layers of the right broad ligament.

A girl, aged 20, had suffered from severe dysmenorrhoea with profuse and prolonged menstruation from the onset at 15 years of age. Bilious attacks had been frequent, and two years previously an attack of severe abdominal pain with vomiting had occurred. Dilatation was performed in January, 1925, but the patient became worse rather than better, and in December, 1925, Miss Ivens had opened the abdomen, removed a swollen, kinked, and unhealthy looking appendix, and incised some small cysts of the ovaries. In the right broad ligament, close to but not adherent to the body of the uterus, there was a swelling the size of a large marble, dark in colour, but with no adhesions. It was enucleated, and the peritoneum stitched. On further examination the little tumour proved to be a cyst containing dark tarry fluid. It was lined by cubical epithelium, and showed in its wall typical endometrial stroma and glands embedded in and surrounded by fibrous tissue.

Miss Ivens said that this case was of interest as it supported the view that endometriomata were due to foetal displacement of Mullerian tissue, and not to endometrial grafts. A somewhat similar specimen had been shown by Mr. Beckwith Whitehouse at a meeting of the Obstetrical Section of the Royal Society of Medicine last year.

Dr. K. V. BAILEY (Manchester) suggested that at a later operation endometrioma of the corpus uteri might possibly be found.

The PRESIDENT thought that all the theories had their points, and that epithelial rests explained the process best.

Uterine Neoplasms.

Mr. J. ST. G. WILSON described an unusual case of carcinoma of the cervix.

A nullipara, aged 30, married seven years, had complained of intermenstrual bleeding for four months. On examination the cervix was found to be replaced by a crater, which was ulcerating, friable, and bleeding. The supravaginal cervix was thickened and the uterus fixed. There was albumin in the urine. At operation growth was seen on the surface of the uterus. The patient died ten days afterwards. The specimen showed growth infiltrating the whole of the uterus, and secondary growths were found in the lumbar glands. Microscopically the growth was of the squamous-celled variety.

Dr. CROFT commented on the rarity of spread to the corpus.

Dr. McMECHAN, in reply, stated that the interpretation of phenomena depended a great deal upon the occupation of the interpreter: the physiologist spoke from the physiological standpoint, the physicist from the physical. The duty of the anaesthetist was to seek out those who were doing and discovering things, and to bring forward their views without attempting to say which were correct in theory. Nitrous oxide and oxygen as an anaesthetic suffered from one basic fault in that everyone imagined that satisfactory anaesthesia could be secured by this means without adequate preparation. It was necessary for the patient to be receptive of the gas type of anaesthesia—he must have a blood stream capable of receiving and using the gas supplied. The anaesthetist must know the metabolism of the patient. Patients with myocardial degeneration could not stand anoxaemia, hence nitrous oxide and oxygen might fail. But if these patients were treated with digitaline they would do quite well with this type of anaesthetic. Toxaemic and septic cases were more difficult to anaesthetize with nitrous oxide and oxygen, and the same held true of those suffering from acidosis and ketosis. The purity of the nitrous oxide also made a difference—as, for example, when there was only a 1 per cent. leeway in administration. Controlled rebreathing, correct pressure, and correct method of administration were also necessary so that the patient's metabolism could be controlled. The problem for the anaesthetist to-day was to realize that it was impossible to give an anaesthetic well without knowing the basic signs of the physiology of gases in the blood.

Dr. McKESSON, in reply, said that unfortunately ethylene did not slow the pulse in cases of exophthalmic goitre. In these cases he reduced the metabolism before operation by rest and morphine. A 10 per cent. reduction of metabolism could be effected by a quarter of a grain dose of morphine. The metabolic theory if applied in clinical work would certainly help. In Toledo both nitrous oxide and oxygen and ethylene and oxygen were being extensively used. In 1925 he personally had not used ether in a single case, and at the Lucas County Hospital one or other of the above anaesthetics had been used in 94 per cent. of cases. This year he had used ether five or six times only.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

RECOVERY AFTER MASSAGE OF THE HEART.

IN the JOURNAL of August 28th (p. 404) Dr. Sainsbury has replied to a criticism that was made regarding the chief agent in the recovery of a patient when heart massage and adrenaline injections are combined. In Mr. Glover's note on this subject (JOURNAL, August 21st, p. 342) a case appears to have been resuscitated by heart massage alone, and I now wish to give an instance where adrenaline succeeded in causing contraction of the heart muscle when massage failed. It is not an instance of either agency being successful in restoring life, but I thought it interesting from the point of view of the comparative values of heart massage and the injection of adrenaline.

The case, which was a desperate one from the first, was that of an Indian woman, aged about 35, who was brought to the hospital with another member of her family suffering from cholera. Before coming to the hospital one of the same family had already succumbed to the disease. On admission it was ascertained that the woman was eight months advanced in pregnancy, and her state of collapse was complicated by total suppression of urine.

Intravenous saline injections, given in the usual way, caused a return of the pulse at the wrist, but with no effect on the secretion of urine. The woman had a show of blood from the vagina, and it was found that the cervix was dilating and that the uterus was endeavouring to expel its contents. Owing to the collapsed state of the patient it was obvious, however, that the power of uterine contraction was inadequate to its task, and knowing from experience the high rate of mortality of pregnant women suffering from cholera it was agreed that the only possible way of saving the woman's life was to empty the uterus. The suppression of urine, if labour had not commenced, would have been a sufficient reason to have emptied the uterus.

When the patient was placed on the table the pulse had again disappeared from the wrist, the extremities were cold and clammy, and she was *in extremis*.

Intravenous saline injection was again given, and after the saline was seen to be flowing into the vein and the pulse returned, extraction of the foetus was made as rapidly as possible. Owing to the rigidity of the cervix in cholera cases there is such a great loss of fluid from the body that softening of the cervix, as in normal labour, is absent. Version was performed, a leg brought down, and in this way the os was dilated.

Before delivery of the child my assistant, Dr. K. Gupta, who was giving the intravenous saline, reported that the flow into the veins had ceased; whilst the placenta was being expelled artificial respiration was commenced as the patient had stopped breathing immediately after delivery. The stoppage of the flow of saline into the vein in a cholera case is usually sufficient evidence that the patient is beyond recovery; with the cessation of respiration one can abandon all hope.

However, on this occasion the abdomen was opened and the heart massaged, but with no result. The diaphragm was then opened, and direct massage to the heart undertaken, but again with no result. The heart could now be seen through the incision in the diaphragm and an injection of adrenaline was given. To my surprise the heart commenced beating, and, what is more wonderful, the intravenous saline commenced to flow into the vein again; in fact, from the time the heart commenced beating, 8 oz. of saline had slowly run in. But during this time, notwithstanding artificial respiration, the woman never showed any signs of breathing, and that she died was no surprise to anyone considering the type of disease from which she was suffering.

This case was as desperate as could possibly be wished to compare the relative efficacy of the two remedies; and although both failed, the chemical stimulant produced some result as against none from the massage.

L. COOK, M.B., F.R.C.S.Eng.,
Lieutenant-Colonel, I.M.S.

Bhagalpur, India.

ACUTE HAEMORRHAGIC NEPHRITIS FOLLOWING INFLUENZA.

DURING the week commencing November 17th I saw four cases of acute haemorrhagic nephritis: the history in each case revealed that coryza with subsequent cough and bronchitis had preceded the attack.

Cases 1 and 2 occurred on the same day in the same family, in a boy aged 3½ and a girl aged 6. I was sent for on account of the "black water" they were passing. They both looked very ill; the eyelids were puffed, there was pallor of the face, with fever (101° F.) and bronchitis. Both complained of pain in the back and over the lower abdomen, with headache. Both were very restless. Ascites developed in Case 1 (the boy) on the third day.

Case 3.—A boy, aged 12, after a severe influenzal attack for which I had treated him a week previously, suddenly complained of pain over the lower abdomen and back; the water he passed was described by his mother as "like bovril." His symptoms were identical with those of Cases 1 and 2.

Case 4.—A man, aged 53, had coryza for two days, and then came to me complaining of passing scanty, "black" urine. The temperature was 99° F., and the pulse normal, but of high tension.

Examination of the urine in each case revealed the presence of blood in great quantity, the deposit in each consisting of red blood corpuscles and leucocytes, with cell and blood casts. It did not contain pus, but albumin was present in each case in excess. The specific gravity ranged from 1016 to 1025.

Cases 1, 2, and 3 were examined also by Dr. R. A. Askins, Deputy M.O.H. Bristol, who agreed that exanthematous diseases could be excluded.

ARCHIBALD S. COOK, M.B.

Southville, Bristol.

NASCENT IODINE IN OTORRHOEA.

THE routine treatment of middle-ear suppuration by nascent iodine, as devised and practised by me, has given better results in both acute and chronic cases than any method of equal simplicity at present available. Applicable to every case, it requires no more skill than is involved in the writing of a prescription. Even in acute mastoiditis, where operation, though clinically urgent, was refused by the patient, it has cured apparently desperate cases.

The method consists in the internal administration of potassium iodide with the local application of hydrogen peroxide drops. An adult patient takes 10 grains of potassium iodide, well diluted, every four hours. Every two hours, or even more frequently, the external meatus is filled with hydrogen peroxide, which is retained for ten minutes. The resulting reaction between the absorbed salt and the applied drops liberates nascent iodine within the tissues of the infected middle-ear cleft. With variations of the dosage of the active salt according to age and idiosyncrasy, the treatment is useful in every case of suppurative otitis media.

F. PEARCE STURM, M.Ch.

Ear and Throat Clinic,
Leigh, Lancashire.

TREATMENT OF GANGRENE OF THE EXTREMITIES.

AT a meeting of the Section of Surgery of the Royal Society of Medicine held on December 1st, with the President, Mr. V. WARREN LOW, in the chair, Professor G. E. GASK opened a discussion on the treatment of gangrene of the extremities.

Periarterial Sympathectomy.

Professor Gask said that his purpose was to restrict the scope of the debate to an exchange of views on the right treatment of an elderly atheromatous patient threatened with gangrene, with special reference to the advisability or otherwise of periarterial sympathectomy. This operation had now been performed often enough to enable some idea of its utility to be formed. The treatment of senile gangrene, either by conservative methods or by amputation, was admittedly unsatisfactory, and it was most desirable, therefore, to know whether this new method was or was not an improvement. The operation first came into prominence from the work of Leriche, who acknowledged that it was suggested to him by Jaboulay, who practised it in 1899 for the treatment of perforating ulcers of the foot. Designed originally to relieve various trophic changes and obscure pains, such as were included under the title of "causalgia"—disorders assigned to disturbances of the vasomotor system—it had more recently been performed for the relief of thrombo-angiitis obliterans, Raynaud's disease, arterio-sclerotic gangrene, and even for ununited fractures, osteomyelitis, and pelvic disturbances in women. After a brief survey of the factors tending to maintain a sufficient blood supply in the limbs, Professor Gask said that the idea of this operation was to divide the efferent sympathetic fibres and thereby abolish the vaso-constrictor control over the whole of that portion of the vessel distal to the point of division. The hypothesis underlying this procedure had, however, been challenged by physiologists, who denied that the sympathetic fibres ran their whole course with the blood vessels, and found that experimental sympathectomy did not increase the temperature or blood flow in the distal part of a limb. It was important, therefore, to consider what happened when this operation was carried out in the human subject, and Professor Gask recounted his own observations in four cases. In one of these (a Jew, aged 34) the operation was completely successful; it was followed directly by a rise of temperature in the affected limb, the blueness of the leg and the pain disappeared, the patient returned to work, and now (two years afterwards) he was still perfectly well. A partial success might be claimed for another case, and in the other two the patients were not improved, though no harm was done. On reviewing the results of this operation as reported in the literature, he could not help being struck by the more or less general agreement with his own results. Sometimes a brilliant success was noted, more often a slight or temporary improvement, and very often none at all. It seemed clear that there was a discrepancy between the findings of the physiologists and the clinicians. Having stated the facts so far as they were known to him, and analysed some of the hypotheses, it seemed that certain conclusions might fairly be drawn. While the results of periarterial sympathectomy were on the whole unsatisfactory, and in senile gangrene good results were not to be expected, it was followed occasionally by an astonishing and unexplained success. In view of the discordant clinical and experimental findings, further knowledge was needed, both about the distribution and function of the sympathetic system and about the more obscure vascular conditions. What, then, was the correct treatment of a patient with actual or impending senile gangrene? Should the leg be amputated, or should an attempt be made to save the limb by rest in bed, warmth, and the application of desiccating powders, aided, perhaps, by sympathectomy? Before looking up the literature he was distinctly in favour of this operation; now he had less belief in it. In conclusion he would say that although amputation might be called for in senile gangrene as a life-saving measure, yet it was best to stave this off by every means available. Though the work on periarterial sympathectomy might not have helped greatly in the treatment of gangrene, it had not been wasted, since it had broadened knowledge of the sympathetic system and created a bond of interest between physiologist and surgeon—an effect which was bound to be of advantage in the long run.

Periarterial Injection of Alcohol.

Mr. SAMPSON HANDLEY thought that Professor Gask's pessimism about periarterial sympathectomy was not justified by a fair interpretation of his own results. He had shown that in man sympathectomy was followed by an increase in the temperature of the foot, and that fact in itself was sufficient to justify the operation. It was not necessary from a practical point of view to explain these results or to bring them into accord with physiological theories on the subject. Of Professor Gask's four cases one was completely successful, the second a partial success, and in the others at least no harm was done. Sympathectomy gave to these patients an even chance of avoiding amputation. The variable results of periarterial sympathectomy might reasonably be explained as due to anatomical variations in the distribution of the sympathetic nerves, particularly as regards the level at which they joined the artery. It appeared to the speaker that Langley's experiments by no means proved the absence of vaso-constrictor nerves from the outer coat of the arteries, even in the animal experimented upon, and that in any case they could not outweigh the direct clinical observations of the effect of sympathectomy in man. It was a remarkable fact that fundamental observations upon the vaso-constrictor nerves were made by Lister as far back as 1854. Professor Gask would be surprised to hear that he (Mr. Handley) had never done sympathectomy. The method almost universally adopted by neurologists for interrupting the continuity of sensory nerves was to inject alcohol into them, and it appeared to him that this method could be adopted to interrupt the sympathetic nerves upon the outer coat of the artery.[1] His plan had been to inject from two to three minims of alcohol at four points, spaced out around the circumference of the artery and into its outer coat. The artery he had employed had been the femoral in Hunter's canal. Apart from its ease of performance, alcohol injection had advantages over sympathectomy. It was noteworthy that Leriche did not record success in the treatment of actual, but only of threatened, gangrene, so that the alcohol method appeared to succeed in cases not amenable to arterial sympathectomy. He would suggest that in Leriche's operation there were two factors at work: (1) interruption of the vaso-constrictor fibres; (2) a local injury of the muscular coat of the artery causing a local muscular spasm which produced the initial constrictor symptoms. The latter factor was very undesirable, and was easily to be avoided by substituting for sympathectomy the method of alcohol injection. The speaker had performed the operation of periarterial injection eleven times. He gave an account of several of these cases, and recorded three in detail. In the first there was re-establishment of colour in the distal half of the foot which had already become cold and black. The line of demarcation healed up, and fresh lines of demarcation formed round the toes. The toes dropped off, and the patient left hospital three months later with a useful foot, free from pain and able to walk. The second case was one of Raynaud's disease, with gangrene of the tip of the left forefinger. Periarterial injection of the left brachial artery was done, and the patient was discharged twenty-six days later with the finger almost healed and less painful. The third case was one of senile gangrene of the left foot; periarterial injection of the left femoral and Hunter's canal was followed by the arrest of the line of demarcation and complete relief of pain in the limb. The patient, however, died of pleurisy two months after a Syme's operation had been performed. After describing other cases, Mr. Handley said he felt unable to recommend alcoholic injection for any condition other than threatened or actual senile gangrene, although it might possibly be

[1] Sampson Handley, *Lancet*, 1922, ii, p. 173.

Dr. FLETCHER SHAW showed a case of acute torsion of a uterus containing a fibromyoma.

The patient was unmarried and 70 years of age. For eighteen months she had complained of recurrent attacks of nausea, which had been attributed to biliousness, but on the last occasion when her doctor had examined the abdomen he had found a large, hard, tender tumour which, the patient stated, had been there for over twenty-five years. A gynaecologist had advised her not to have any operation performed. The tumour was very hard; it extended to the umbilicus, was apparently fixed to the uterus, and was extremely tender. A diagnosis of a degenerating fibroid was made, and an abdominal section performed the next day. It was then found that the uterus contained a fibroid in the fundus about the size of a foetal head and of stony hardness, due to calcareous degeneration. The uterus and appendages were twisted round in two complete turns, and so had formed a narrow pedicle just above the level of the internal os, no thicker than a man's finger. The broad ligaments and tubes were of a deep purple colour, many of the veins were thrombosed, but in some the blood was still fluid, so apparently there was a small circulation still kept up. The tumour was easily removed at the site of the torsion, and the patient made an uninterrupted recovery.

ADVANCED ABDOMINAL PREGNANCY.

Professor PHILLIPS described a case of advanced abdominal pregnancy, and said that his object was to draw attention to the frequent difficulty of clinching by the ordinary means of examination this diagnosis. The clinical history might, as in the present case, be highly suggestive, and yet a careful physical examination, by the ordinary methods of palpation and auscultation, might fail to give convincing evidence of the presence of a foetus in the large abdominal tumour. This had been his experience in five out of the six cases with which he had had to deal. On this occasion the clinical story was classically descriptive of this unfortunate form of gestation. Therefore, when he had failed to palpate any part of a foetus in the abdominal tumour, he felt pretty confident that an *x*-ray examination would reveal one. The photograph showed not only a foetus, but also a position and condition of that foetus which could best be explained by its being dead and in an extrauterine sac. The skull was lying in the left iliac fossa; the bones of its vault were overlapping. The spine lay across the upper region of the abdominal tumour, and was compressed into the arc of a circle in such a degree as was hardly likely to occur within the uterus.

The story was as follows:

A woman, aged 30, had had a dangerous attack of pelvic peritonitis two and a half years previously, after a miscarriage at eleven weeks. This was her first pregnancy. Menstruation was scanty afterwards, but she did not miss a period until March of the present year. Her last period had been on February 13th, and there was a slight show unaccompanied by pain nine weeks after. Morning vomiting, secretion in the breasts, and steady enlargement of the abdomen duly followed. She quickened at four and a half months, and felt movements daily until September 4th, when she had severe abdominal pain accompanied by a dark bloody discharge, and also diarrhoea and vomiting. Premature labour was suspected, and she went into a maternity home. The external os just admitted the finger tip, and in the course of six days the pain and vomiting ceased and the patient was sent home. No further foetal movements were felt, and the breasts and the abdomen lessened in size; a slight, very dark, blood-stained discharge occurred daily.

When Professor Phillips saw the patient on October 21st (thirty-six weeks after the last period) there was a globular elastic mass visibly distending the abdomen and reaching from the pelvic brim to a point two inches above the navel. It possessed none of the signs of an enlarged uterus, and no foetal parts could be made out. On vaginal examination the cervix was soft, the os was closed to the finger, and bimanually the slightly enlarged body of the uterus could be palpated behind and to the right of the lower pole of the abdominal tumour, which could just be reached at the pelvic brim. The pelvo-abdominal tumour felt just like an ordinary cystadenoma of the ovary.

The *x*-ray examination having established the diagnosis, Professor Phillips opened the abdomen on November 12th, thirty-nine weeks after the last period. On incising the peritoneum about a pint of thin, clear fluid escaped from a localized space within which was exposed a second sac—the amnion—closely shrouding the foetus. This sac contained rather less than half a pint of thick, greenish, opaque fluid. Both fluids were odourless. The foetus was lifted out and the cord divided. The sac was now seen to line the true pelvis and the abdominal cavity to above the umbilicus. The transverse colon, adherent to the abdominal wall, formed the upper limit of the gestation sac. None of the pelvic organs could be seen through the sac. The stump of the umbilical cord with the contiguous amnion and chorion were separated from the placenta, which was found to be plastered on the upper half of the sacrum and the adjacent lower half of the lumbar spine. In doing this a certain amount of the placental substance also was torn away, but without causing any bleeding. The placental tissue was of a dull grey colour and appeared bloodless. No attempt was made to separate it from the underlying aorta and other large vessels. The sac having been swabbed dry, the abdomen was completely closed in the usual layers, interrupted sutures being used in each layer.

This operation had been performed only seven days ago. So far the temperature and pulse rate had remained normal as they were before the operation, and there had been no abdominal pain or even discomfort.

TREATMENT OF OVARIAN CARCINOMA.

AT a meeting of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine on November 19th, the President, Dr. ARCHIBALD DONALD, in the chair, Professor BECKWITH WHITEHOUSE showed a woman with ovarian cancer and peritoneal metastases, who had been treated by transfusion of blood and injections of radiated ascitic fluid. The clinical details were as follows:

A woman, aged 48, the mother of five children, had had her right breast removed in October, 1924, for scirrhous carcinoma. She had consulted Professor Whitehouse in March, 1926, for abdominal distension and progressive weakness. Her abdomen was much distended by ascites, and several hard tumours could be felt; a large mass filled the pelvis, extending above the pubis. The abdomen was opened, and it was found that the ovaries had been replaced by masses of growth which had also infiltrated the omentum and studded the visceral and parietal peritoneum with nodules. The greater part of the ovarian masses was removed, but a portion about the size of a billiard ball was allowed to remain on the left side of the pelvis. Ascitic fluid was collected in a sterile vessel and exposed to 100 mg. of radium element in 1,000 c.cm. of the fluid for twenty-four hours. At the end of the operation the patient was transfused with one pint of blood from a healthy young woman who had reached the tenth week of a normal pregnancy. The patient recovered well from the operation, and was subsequently treated by subcutaneous injections of 10 c.cm. of the radiated ascitic fluid twice a week. The dose was reduced to 5 c.cm. seven months later, and had recently been stopped, a total of 500 c.cm. having been injected. Each treatment with ascitic fluid was followed by a marked general reaction. The patient had subsequently done well and there had been no recurrence of the ascites. The masses of growth previously palpable in the abdomen had disappeared, including the deposit in the position of the left ovary; the patient's general condition had improved very markedly.

Professor Whitehouse considered the result very encouraging, though it was too early to form an opinion as to the final state. The treatment had included two different methods of dealing with malignant disease: the first was the introduction into the circulation of a syncytiolysin by the transfusion of blood from a patient at a period of pregnancy when such a substance, if it existed, was presumably most active. The second method was the employment of the cancer cell vaccine, utilizing the available ascitic suspension, in which the malignant cells had been destroyed by radium and not by heat.

Ascites of Unknown Origin during Pregnancy.

Professor HENRY BRIGGS reported the case of a previously healthy woman, aged 40, who had had four children, and had suffered from amenorrhoea for eleven months. The abdomen was increasing in size in consequence of ascites, and marked albuminuria was present. The uterus was enlarged and could be felt as an abdominal tumour; it was removed by laparotomy and the ascitic fluid drained away. No cause of the ascites was found in the peritoneal cavity. The patient made an uninterrupted recovery.

Mr. T. G. STEVENS described the case of a woman who had been under his care during three successive pregnancies in which there was enormous increase in the size of the abdomen due to ascites. On each occasion the patient had a normal full-term delivery, and no cause for the ascites was found at any time. After the first and second pregnancies the ascites rapidly disappeared, but remained for a long time after the third child had been born. The fluid was removed by tapping and no further accumulation occurred.

members of both societies were being asked to share in the organization of this section.

The announcement, continued Professor Leiper, that a new International Congress of Zoologists would meet next summer made pertinent the subject of the tyranny of nomenclatural rules in medicine. The parasitologist suffered more than most zoologists from changes in the names of the subjects in his own group, and was compelled to keep abreast also in names of an immense number of vectors and hosts.

At first sight the operation of the laws of nomenclature appeared to offer a prospect of stability and nomenclatural tranquillity, but it was discouraging to find that after two decades there was neither certainty nor peace. During his own time Dr. Leiper had seen many changes in the scientific names of the common helminths of man. These alterations had been a source of considerable annoyance to medical men and bitter complaint from medical students; this had been attributed to ignorance of universally applying rules. Everyone, however, was now aware of their existence, and this could hardly be the cause. He did not believe, however, that it could seriously be maintained that the rules were applied as rigidly and consistently to early as to more recent records. The "law of priority" insisted on the employment of the earliest record, provided it was published and accompanied by some definite indication and that the author applied the principle of binary nomenclature. Works previous to 1758 (when Linné published the tenth edition of his *Systema Naturae*) were not regarded as binominal. But many of the workers subsequent to Linné did not consciously put the binary system into practice. Goeze, for example, in 1782, did not accurately follow the Linnaean method; yet the names of several important parasites had been changed during recent years to give priority to his names—for example, *Taenia mediocanellata* has been replaced by *Taenia saginata*. Similarly *Dioctophyme* was generally replacing *Eustrongylus*, although the name had been used as a colloquialism by its French originator. *Dracunculus* was merely a vernacular term for the guinea-worm until used by Cobbold in 1864, by which time it had been applied to a group of reptiles many years previously. One of the rules of nomenclature required the citation of the author's name immediately after the specific name in order to hold him responsible and as a bibliographical aid. But this rule was loosely applied to the earlier works—for example, *loa* was not originated by Guyot as was usually stated; he merely quoted the word as the native vernacular name for the eye-worm, and it was not made a specific name until 1864, when Cobbold used it as such.

Recently the well known *Filaria bancrofti* had been placed in the genus *Wuchereria*, which was attributed to Araujo. On a recent visit to America he had discovered that *Wuchereria* was used by Araujo as a specific, not generic, name, and used, too, before *bancrofti*. The name was used in 1921 by Seurat in a generic sense, and the modern name should be therefore *Wuchereria wuchereria* (Araujo, 1877), Seurat, 1921. But this also was probably incorrect, as under the rules compound words might form a valid specific name if used to connote a simple object, and this parasite had been called *Filaria sanguinis hominis* at an earlier date than *Wuchereria*: *Filaria sanguinis hominis* was not trinominal; it represented a simple object —namely, the blood of man—and seemed as valid as those quoted by the Commission as acceptable. This parasite might ultimately have to be called *Wuchereria sanguinis-hominis*.

This state of affairs appeared intolerable. The International Commission, however, had plenary power to suspend any of the rules which seemed to cause greater confusion than conformity. Steps should be taken to press for an extension of this ruling to place well established names upon a list. The principles guiding the compilation of this list should be (1) the use of the name in most common use, (2) a name if possible describing the disease, (3) a name conforming to the vernacular or technical foreign names, (4) the law of priority should not be applied. Such a list, keeping as much as possible to traditional names, would lighten the task of the teacher, and of the student, who often wasted valuable time in committing to memory lists of names unfamiliar to him but describing familiar parasites. The alternative was to depart entirely from zoological nomenclature and adopt an agreed scheme of medical terminology which was subject to no rules of priority.

He suggested that some independent body might be willing, after consultation with teachers, writers, and investigators, to undertake the preparation of a nomenclature for medical parasitology.

Dr. MANSON-BAHR said that he agreed with Professor Leiper in principle, but in the past he had followed the teaching of authorities in the matter of nomenclature. He suggested that names might be standardized as they were at present. Dr. NICOLL agreed that the time had come when some steps must be taken to stabilize medical nomenclature. The International Commission had done much to improve matters, but the constant endeavours of some parasitologists to search old records in an attempt to stabilize matters had caused much confusion. He believed that some plan might be discovered whereby everybody—medical and zoological—might have some common stable scientific nomenclature. Sir LEONARD ROGERS considered that there were too many systems of classification and nomenclature, and suggested that the ordinary terms in textbooks might form the basis of a permanent system.

Papers.

Papers were contributed by Dr. S. V. VAN NIERKERK of Natal on two cases of pseudo-hermaphroditism in native labourers in Johannesburg; by Dr. AZIM on a species of *Eimeria* in rats in England; and by Miss HILES on various methods of diagnosing hydatid infections in man, including the complement fixation test, the precipitin test, and the Casoni intradermal test.

JAMES MACKENZIE INSTITUTE.

Arterio-sclerosis.

PROFESSOR ASHLEY MACKINTOSH, on November 9th, reviewed first the groups of causes known to influence or to co-operate in the production of arterio-sclerosis, and emphasized the importance of first removing these in any attempt at treatment of the condition. He mentioned amongst these "wear and tear," especially from worry, and infective or toxic causes, not necessarily of gastro-intestinal origin. In this connexion he professed himself a believer in an hereditary variation in the viability of the vessels. The lecturer was emphatic in his belief that the most effectual régime for the sufferer from hypertension was one in which avoidance of any thoughts centred on himself was ensured, as far as possible, and for this reason he deprecated the too frequent recording of blood pressure readings, and insisted on the avoidance of a "hypertension hypochondriasis" (Osler and McCrae). He found greatest benefit from a mode of life which involved as little interference with habits, work, and food as possible, especially in elderly patients, and outlined in detail the ideal diet for the hypertension subject. In this he did not reduce protein drastically, but allowed 3 to 5 oz., especially of white meat, per diem, believing that too much importance had been ascribed to protein overfeeding. Diets must not be cut down so far as to lower the patient's general condition. He outlined the proper care of the skin and bowels, and strongly advocated the weekly or bi-weekly use of calomel. Under medicinal treatment he described those drugs from which he had had beneficial results, but before doing so put the question as to how far hypertension was a compensatory function, and he showed that it was not apparently so in so far as the kidney was concerned, there being no proved relationship between the power of concentrating urea and the blood pressure. He referred to other methods of treatment—by venesection, by electrical methods, and especially diathermy. Finally, he urged the importance of watching the heart carefully in every case of arterio-sclerosis, and sketched the methods which were of service in the treatment of acute complications, such as anginal attacks or oedema of the lungs.

of benefit in the gangrene of Raynaud's disease. He had not found in the upper limb such definite effects in raising the temperature of the limb below as were met with in the lower limb. He believed, however, that in senile gangrene, before the word "amputation" was even breathed, a trial should be made of the effects of periarterial alcoholic injection. Even should it fail it might enable a lower amputation to be done than would otherwise be the case. In itself the operation was a safe one, but the danger of absorption of the toxic products of tissue neurosis must be guarded against by doing it early before extensive gangrene had occurred.

Mr. PHILIP TURNER said that although he had never performed the operation of periarterial sympathectomy he had in four cases carried out the periarterial injection of absolute alcohol on the lines recommended by Mr. Handley. The first case was that of a man of 70, with dry gangrene of the right big toe. There had been attacks of pain in both feet for over a year, and since the appearance of the gangrene two months before the pain had been severe enough to prevent sleep. Besides the gangrenous toe there were large discoloured patches on the dorsum of the foot, and the whole foot was swollen and was colder to the touch than the sound foot. The femoral artery when exposed in Hunter's canal was found to be a rigid calcified tube; no pulsation could be detected. The delicate outer coat was injected with 10 minims of absolute alcohol, introduced through four punctures with a very fine hypodermic needle. This produced a grey discoloured area, about half an inch long, round the whole circumference of the artery. Next day the pain had disappeared, two days later the swelling of the foot had gone, a few days later still the areas of apparent gangrene on the dorsum and sole of the foot recovered; in a fortnight the formation of the line of demarcation had rapidly advanced, and in a month the toe had separated after the tendons had been divided with scissors. The patient then started to walk about in comfort, but it was many months before the granulating surface left by the separation of the toe had healed. He continued to do well, and a year after the operation had moved away into the country. The patient's doctor now stated that the wound remained healed two and a half years after the operation, there was no recurrence of gangrene, the patient was well, without pain, and able to get about. Mr. Turner also described his other cases, one of which promised to be a success until cerebral haemorrhage occurred, and the other two were failures; but in both the patients' condition was so unsatisfactory that they would probably have died in any case. In three of the cases, and to some extent in the fourth, the operation was followed by increased warmth of the foot, which could only have been due to an increased amount of blood in the tissues. The technique was not quite as easy as it appeared at first sight. A very fine needle was essential. One advantage of the operation was that it offered an alternative to amputation. He was decidedly in favour of it, and believed it would help, in Professor Gask's words, "to stave off amputation by every means in our power."

Mr. J. P. Ross said that Professor Gask had laid stress on the discrepancy between the facts bearing on the sympathetic supply to the blood vessels as discovered by physiologists, and the clinical results of periarterial sympathectomy. A possible explanation of this discrepancy was that in the operation it might not be the efferent nerves to the vessels that were removed, but afferent nerves from the blood vessels to the spinal cord. The muscle of the arteries, especially the arterioles, and the contractile tissue of the capillaries possessed tonus which was controlled by vaso-constrictor and vaso-dilator nerves. Sherrington had likened the control of this tonus to the control of the tone of voluntary muscle, which was regulated partly by a reflex arc—an afferent neurone from the muscle, a synapse in the cord, and an efferent neurone back to the muscle. There might possibly be a similar arc to control blood-vessel tonus. There was plenty of evidence—histological, experimental, and clinical—that afferent fibres did pass from the blood vessels to the central nervous system, and mostly from the proximal portions of the limb vessels. It was conceivable that the arc controlling tonus was broken on the afferent side by the operation of periarterial sympathectomy, and this would explain why an operation on the proximal part of a limb could affect the distal portion. Two points—one of experimental and the other of clinical interest—might be mentioned in this connexion. Section of the depressor nerve, the great afferent nerve from the aorta, led to vaso-dilatation all over the body. It therefore seemed possible that division of afferent fibres on the femoral artery should lead to vaso-dilatation in the leg. The clinical observation that the operation was immediately followed in all cases by relief of pain suggested strongly that afferent impulses were being blocked on their way to the central nervous system.

Mr. E. G. SLESINGER had performed periarterial sympathectomy fourteen times on eight patients. He could see no advantage in Mr. Handley's alcohol method over the operation of stripping, and thought the danger of injecting alcohol so close to the muscular coat to be just as potent as that of surgical section. The primary vaso-constriction seemed to be due to trauma of the muscle coat and could be avoided by gentle handling. It was most important to verify the tissue removed as being nerve plexus by section; in some cases of failure areolar tissue only might have been removed. Of his cases two were Raynaud's disease affecting the anus, and in both the pain and tingling which had prevented sleep disappeared and the colour improved. Two were cases of thrombo-arteritis obliterans with gangrene, and the pain disappeared. In one case of senile gangrene affecting the heel complete relief followed, and in one of arterio-sclerotic gangrene, with one leg previously amputated, there was marked improvement. The remaining two cases were of obscure pathology. One was a man with calcification of the arteries who had recurrent attacks of phlebitis, with gangrene of two toes and of the other heel. He showed a curious change after the operation, developing what the speaker thought was an acute eczema of one foot and leg. Dr. Semon, who saw the case, considered it to be an exudative condition with no sign of inflammation. The last case, a recent one, was a patient from East Africa who had a chronic ulcer on one heel and gangrene of the opposite big toe. At operation the artery on both sides presented an acutely oedematous condition of the adventitia, with acute injection of its vessels. Periarterial sympathectomy was done, with relief of pain. The ulcer on the heel had healed, and the toe appeared to be doing so, although only six weeks had elapsed. Mr. Slesinger emphasized the lack of knowledge of the state of the vessels in these gangrene cases in the living, and thought that this operation would throw light on that subject. In his view the relief of pain justified the procedure. He had always proposed it as a pure experiment, without promising results, and in all his cases the patient had asked for it to be done on the second limb when two limbs were affected.

ZOOLOGICAL NOMENCLATURE IN MEDICAL LITERATURE.

AT a meeting of the Section of Tropical Diseases and Parasitology of the Royal Society of Medicine, held at the society's house, 1, Wimpole Street, on Wednesday, December 1st, at 5.30 p.m., the President, Professor R. T. LEIPER, F.R.S., read a paper on the tyranny of nomenclatural rules in medicine.

Before commencing his paper Professor Leiper stated that he regarded it as a high privilege to follow Sir William Prout and Sir Leonard Rogers as president of the section. With them he was one of the small band of workers who initiated the section, believing that tropical medicine should be given a recognized place among the other branches of the Royal Society of Medicine. The work of the section was in no way antagonistic to the Royal Society of Tropical Medicine, to which every medical man working in the tropics should belong. There was a wide field for both bodies, and support was obtained for that view by the preparations now being made by the British Medical Association to form a Tropical Diseases Section for its Annual Meeting at Edinburgh next year.

oxygen is a pure oxidation metabolism, glycolysis disappearing under aerobic conditions. This he regards as the main point of difference between normal and pathological growth. It might be supposed that if the oxygen metabolism of an embryonic cell were reduced from any cause the cell would acquire the characters of a cancer cell. This, he thinks, does not happen, because embryonic cells cannot survive under anaerobic conditions, whereas the cancer cell can, as was pointed out above. With regard to adult resting tissues, these are in reality slowly growing tissues and therefore exhibit a slight glycolysis. The relation of cancer metabolism to that of other cells may, according to Warburg, be thus stated: In embryonic cells there is a large anaerobic glycolysis with a correspondingly large oxidation metabolism; in adult stationary tissue there is a small anaerobic glycolysis with a relatively large oxidation metabolism; in carcinoma arising from the stationary condition of the cells the glycolysis is again increased to the embryonic amount, but no corresponding increase in the oxidation metabolism occurs. The experimental data on which these conclusions are based are fully stated in Warburg's book.

Although lucidity is undoubtedly the primary desideratum in scientific writing, there is no doubt that an author adds charm to his literary work by leaving somewhat to the reader's imagination. This, however, can be carried too far, and we think that Dr. GREIL's book on the cancer problem[4] is open to criticism in this respect. Voltaire's dictum that language was given to us to conceal our thoughts should not be followed to the point of complete incomprehensibility. Dr. Greil has to some extent compensated for this defect by inserting several critical reviews of his work by writers who are endowed with the faculty of interpretation, and from these it is possible to gather a general idea of his meaning. Thus Dr. Dürck writes as follows:

"Dr. Greil's treatise, which he designates a 'programmatical exposition,' explains tumour formation as a disordered process of early embryonic development. It must be admitted that his manner of rendering his ideas acceptable is complicated in the extreme, not to say eccentric. The language he employs requires a study in itself, and is permeated with conundrums and words of his own coinage. He explains that all growth forms arise from cell-municipal potential acquisitions between daughter cells and neighbour cells, layers and tissues, at the wrong place and wrong time, and in wrong intensity and wrong combination. Among these cell-municipal potential acquisitions are included, the acquisition of layer differentiation, layer support by favourable metabolic conditions, marginal or apical differentiation through tensional release, altoric potential of palisade tracts, haemo-vasogenic potential through unequal space differentiation of vascular channels, intercalation in the transit and discharge of reaction products of neighbouring layers with higher potential, distraction potential with demarcation of growth foci, and so on. It is usual to associate language with thought, but with the best will in the world mental processes are nonplussed amid the whirligig of the author's sentences. At every page we are confronted with monstrosities of word and phrase, confounding the understanding. We regret, therefore, that we are unable to express an opinion with regard to the meaning of many of the author's chaotic utterances. If we understand him aright, he considers one of the causes of tumour formation to be the close connexion of the foetus with the mother, the foetus forming a segment of the materno-foetal total constitution; and that abnormal changes in the maternal metabolism react on both organisms. Among these changes Greil reckons a disposition to tumour formation—a neoplastic diathesis—but how this comes about is by no means clear."

We do not recommend this book to those who have not a fair knowledge of the German language; a dictionary is of little assistance.

THE CEREBRO-SPINAL FLUID.

THE Association for Research in Nervous and Mental Disease makes its contributions to medical literature in the grand style. This society of American clinicians and experimentalists meets annually to deliberate upon some special problem within its field of interest. The complete proceedings are then handed on, without any undue haste, to a larger audience in the form of a large and elegant volume, of which the most recent is the *Human Cerebrospinal Fluid*,[5] being the report of the conference held at the end of the year 1924. The symposium takes the customary form of a series of papers introductory to general discussions of the subject from various angles. The latter are preserved in the form of question, answer, and spontaneous comment, though competent editing has served to eliminate the equivocations which arise inevitably in unrehearsed discussion. This form certainly enhances the interest and mitigates the severity of the objective contributions with a human note and the sense of the impact of personal opinion and experience.

It is claimed for the book that it is the most comprehensive survey of the physiology and pathology of the cerebrospinal fluid which we have. The claim must be conceded. Introductory papers deal with the history of the fluid, a résumé of the literature, and a comprehensive analysis of the biological, chemical, and physical characteristics of the fluid in normal and abnormal conditions. Those who find occasion to employ the colloid tests generally advocated will be interested in the record of the comparison in 400 cases of the gum benzoin, colloidal gold, and mastic tests. Full protocols are given, and it is to be observed that discrepancies were encountered in only 16 cases.

Some interesting pressure studies are reported which include observations upon the effect on hypertension of the injection of a variety of hypotonic solutions. A plea is entered for the synchronous determination of pressure at different places in the diagnosis of brain and cord tumours. The value of and risk attending the employment of lipiodol and the method of simultaneous displacement of fluid by air as aids to ventriculography are discussed from the experience of several members. There follows an extensive survey of the changes which are found in the cerebrospinal fluid in all types of diseases of the central nervous system and in certain extraneural conditions; the concluding section deals with intraspinal treatment, particularly in respect of syphilis of the central nervous system. Over 5,000 recorded examinations form the basis of the clinical contributions, which cover nearly every conceivable pathological state.

It is but two centuries since the ridicule of Goethe sought out those who found in the fluid of the cavities of the brain the vehicle of the animal spirits—the very organ of the soul. It is but thirty-five years since Quincke set the fashion for lumbar puncture, which has to-day become routine for diagnostic and therapeutic purposes. For the interpretation of the chemical, physical, and bacteriological assay of the cerebro-spinal fluid and of *x*-ray and pressure observations, this elaborate—but, alas! costly—volume should become the standard work of reference.

THERAPY EXPERIMENTAL AND PRACTICAL.

THE publication has begun of a book on practical therapy[6] based on experimental investigation, edited by Professor VON DEN VELDEN and Dr. P. WOLFF. It is one of the big co-operative works which are so much in favour with German publishers just now. The first volume, which is in two parts, contains over 1,100 pages, and deals with the general principles of therapeutics. In the second, the therapeutic measures appropriate to the various diseases are to be considered.

In the preface the editors discuss the present position of therapeutics. They point out that no rational therapy was possible until physiology and pharmacology had developed sufficiently to provide a basis of exact knowledge, and that in consequence the founders of modern medicine in the middle of last century gave attention chiefly to the diagnosis of disease based on the exact science of morbid anatomy. Virchow expressed the general attitude to therapeutics of the leaders of medical thought in all countries when he said: "Therapeutics must free itself from empiricism, and by the help of pathological physiology rise to be a science, which to-day it is not." Unfortunately this development has been very slow in coming. Virchow's school, which had many influential adherents among English teachers, performed a great service to

[4] *Das Krebsproblem.* Von Dr. Alfred Greil (Innsbruck). Leipzig: J. A. Barth. 1925. (Med. 8vo, pp. viii + 182. R.M. 6.)

[5] *The Human Cerebrospinal Fluid.* An Investigation of the Most Recent Advances as reported by the Association for Research in Nervous and Mental Disease. New York: P. B. Hoeber, Inc. 1926. (Med. 8vo, pp. xxvi + 568; 68 figures. 10 dollars.)

[6] *Handbuch der Praktischen Therapie als Ergebnis Experimenteller Forschungen.* Erster Band. Erste und Zweite Hälfte. Herausgegeben von Reinhard von den Velden und Paul Wolff. Leipzig: J. A. Barth. 1926. (Sup. roy. 8vo: Part I, pp. viii + 544, 4 figures; Part II, pp. 593, 11 figures, 2 plates. R.M.66; bound, R.M.73.50 the two parts.)

Reviews.

DERMATOLOGY.

SOME years ago an American dermatologist, writing in one of the journals devoted to his specialty, expressed his opinion that there were too many textbooks on general dermatology and too few monographs on particular branches of the subject. While this may be true so far as the specialist is concerned, it does not apply to the profession as a whole; indeed, it is only through the agency of the standard works that the practitioner can hope to learn the trend of modern dermatology, and it is significant that Dr. J. H. SEQUEIRA points out in the preface to the fourth edition of his well known *Diseases of the Skin*[1] that its appearance has been unavoidably delayed by, among other things, the enormous output of dermatological literature since the war.

The task of selecting from this mass production of post-war literature what seems of importance, or appears likely to be of permanent value, has been carried out by the author with careful discrimination, and the short bibliographies appended to the sections will be found particularly useful by those who desire to consult the original papers. Throughout the text the reader cannot fail to perceive the impress of the author's great personal experience. We think Dr. Sequeira has been wise to resist the temptation to expand and enlarge the book, which, although it contains much new material, remains of exactly the same size as the previous edition. The same high level of excellence is reached, and we are confident that the book in its new dress will achieve the success its many admirable qualities deserve.

THEORIES ABOUT CANCER.

ALL questions relating to the causation of cancer are at present so dominated by the recent discoveries of Gye and Barnard that the older theories have to a considerable extent lost colour. Nevertheless, in so far as the latter provide an impetus to the discovery of new facts and suggest lines of investigation, their value is not to be overlooked. A case in point is the volume recently published by Professor van Calcar of Leyden on the cause of cancer.[2] He is convinced of the protozoal origin of cancer, and he has recorded some interesting experiments in support of the theory. Thus, inflammatory foci are found in the livers of dogs and some other animals, which contain a small trematode, the *Metorchis truncatus*; if these worms are placed in a decoction of wheat and studied under the microscope, they will be found to disintegrate in the course of a few days, and in some of the cultures minute flagellate protozoa will develop. Van Calcar found that the protozoa only developed from trematodes which were taken from foci exhibiting atypical epithelial proliferation and not merely simple inflammatory changes. In the case of experimental tar-cancer, again, the author considers that protozoa are derived from the food and the surroundings of the animals, in which they may occur in enormous numbers. If cancer is related to the presence of protozoa the number of positive results should diminish when precautions are taken to protect the animals from contact with protozoa. This was found to be the case; in the great majority none but simple inflammatory changes occurred. Other experiments were suggested by Stahr's experimental production of cancer of the tongue in rats by feeding them on oats, the roughness of the grain causing abrasions of the mucous membrane. Van Calcar has found that smooth grain, such as wheat, will produce the same result, provided an artificial abrasion is made; and he has also shown that protozoa can be cultured from these and other types of grain in abundance. In two experiments he inserted, beneath the intestinal mucosa of dogs, grains of oats and wheat in which protozoa were known to be present; in both he obtained positive results. In another series of experiments he curetted away a small area of the gastric mucous membrane, and fed the animals on food containing protozoa derived from various sources—from grain, from cockroaches, from larvae developed in decoctions of grain, and from foci of metorchis in the liver. In all cases he obtained malignant growths showing atypical proliferation, anaplasia, numerous mitoses, infiltration, and metastases. The instances cited all presuppose a local precancerous condition of some kind. As an example of a generalized precancerous condition the author takes achylia; a dog in which the stomach had been excised two years previously was given water containing protozoa. It became emaciated and died in a few weeks. Numerous small tumours were found in the mucous membrane of the stomach and intestines with metastases in several of the mesenteric glands. Van Calcar discusses fully the histology of these induced carcinomas, and illustrates what he has to say by a large number of microphotographs. His experiments on the culture of protozoa from carcinoma are, perhaps, less impressive. The method adopted was to make an emulsion of tumour substance in sterilized water, distribute the liquid over a number of Petri dishes, remove the cover of the first culture after twenty-four hours, of the second after forty-eight hours, and so on till all the cultures had become dry. The dried mass was then moistened and, as far as possible, distributed through water. In some cases rapid drying by means of a powerful desiccating agent was employed. In the cultures so obtained, both from experimental tumours and from those removed surgically, the author repeatedly met with structures which he considered to be morphologically identical with the spores of protozoa.

DR. OTTO WARBURG has collected a series of articles on the metabolism of tumours[3] that have appeared in various periodicals during the last eighteen years, and has added some chapters on experimental technique. The volume embraces an important series of observations on the characteristics of cancer metabolism. Having observed that the oxygen metabolism of the ovum of the sea-urchin increased sixfold on changing, under the influence of fertilization, from the resting to the active condition, Warburg conceived that the abnormal activity of the cancer cell might be due to a similar high oxygen metabolism. This proved not to be the case, the cancer cell showing no difference from the normal resting epithelium in this respect. He then suspected that the source of the enhanced energy of the cancer cell would be found in ferment metabolism (glycolysis, or the conversion of sugar into lactic acid). That the cell does actually utilize this source of energy he proved in the following way: A slice of rat carcinoma was placed for twenty-four hours in warm Ringer's solution, saturated with nitrogen to ensure anaerobic conditions and the exclusion of oxygen metabolism. It was found that if the solution contained sugar the tumour could be transplanted as readily as in the fresh condition; but if it contained none the tumour ceased to be transplantable. Ferment action alone, and in the absence of oxygen metabolism, was thus shown to maintain the vitality of the cell. A series of experiments was next planned to show what modification in the anaerobic glycolysis resulted from an access of oxygen. It had already been shown that, in the case of muscle, an access of oxygen will prevent the appearance of lactic acid—that is to say, the glycolysis disappears. In cases, however, where anaerobic glycolysis is large in amount, as in yeast fermentation, and oxidation metabolism is relatively weak, glycolysis persists even in aerobic conditions. Such was found to be the case with the cancer cell. In this respect it differs from the cells of non-malignant tumours; in the latter, anaerobic glycolysis is similar to that in cancer, but oxidation metabolism is much greater, non-malignant tumours producing three to four times less lactic acid per molecule of oxygen absorbed than cancer. It is to be noted that the difference is one of degree rather than of principle. On comparing embryonic tissue with pathological growths, Warburg found that anaerobic glycolysis was similar—that is, it was large in both—but that in embryonic tissue, in contrast with cancer, the metabolism in the presence of

[1] *Diseases of the Skin.* By James H. Sequeira, M.D., F.R.C.P.Lond., F.R.C.S.Eng. Fourth edition. London: J. and A. Churchill. 1927. (Med. 8vo, pp. xii + 644; 309 figures, 56 plates. £2 2s. net.)

[2] *Die Ursache des Carcinoms.* By Professor R. P. van Calcar. Leyden: S. C. van Doesburgh. 1926. (Roy. 8vo, pp. 66; 45 figures. Fl. 3.60.)

[3] *Über den Stoffwechsel der Tumoren.* Herausgegeben von Otto Warburg. Berlin: J. Springer. 1926. (Roy. 8vo, pp. 263; 42 figures. R.M. 16.50; bound, R.M. 18.30.)

It is not easy to surmise what object Sir BAMPFYLDE FULLER had in view when he wrote his book *The Law Within*.[10] In his introduction he says that during the last fifteen years his thoughts have been occupied with endeavours to discover the laws which underlie human nature, "to bring within the domain of scientific generalization man's various activities—whether in industry, politics or war, in self-centred, social or religious life, in science or in art." The author confesses that although he has written several books on the subject they have received scant attention, and perhaps we may help with the suggestion that his purpose lacks clearness, that his method is discursive, and his length inordinate. Apparently, having found no satisfaction in biology, physiology, and psychology, Sir Bampfylde feels the need of a new science, to which he gives the name "biothymology." Psychology, he thinks, has failed because it has practically ignored the law of evolution; while biology and physiology have closed their eyes—strange to say—"to the quality which must exist in the constitution of all living organisms—whether animals or plants—that are formed by the combination of two sexual elements." Biologists, influenced by the utilitarian spirit of the age, have clung to the belief that changes which have come about through evolution have always been purposeful; whereas, according to Sir Bampfylde, evolution may be expressive as well as useful, and Nature may be as magnificently purposeless as Art. In developing the thesis—whatever it may be—a vast amount of ground is covered. We learn that feminine energy is inclinational, and therefore practical and purposeful; while masculine energy is expressive and emotional. We are given as the argument against socialism the statement that idealism, being a motive of expression, "cannot maintain its ardour against the chilling effect of practical considerations." We are told that admiration is not as powerful as apprehension in withstanding onsets of cupidity or anger; consequently that the League of Nations will hardly hold its own against outbursts of national feeling so long as it has no punitive powers. It will be seen, therefore, that "biothymology" has a very wide range.

In *Nomogenesis or Evolution Determined by Law*[11] LEO BERG, professor of geography in the State University of Leningrad, states the case against Darwinism with much ability and wealth of detailed argument. He contends that evolution does not depend on chance variations and the survival of the fittest in the struggle for existence, but is based on laws, and is in great measure an unfolding of pre-existing rudiments. As Professor D'ARCY THOMPSON says in his genial introduction, the book is interesting and contains much of recent Russian work, but the views expressed are hardly likely to be universally accepted. It has been admirably translated from the Russian, and, since the last edition, has been supplemented by much new matter. A feature, not always noticeable in foreign books, is the frequent reference to British biologists.

Messrs. Churchill have now issued the *Medical Directory*[12] for 1927. Its general arrangement and appearance are unchanged, and the work as a whole follows the familiar lines which have made it so useful a reference book during the past eighty-two years. The numerical summary of the medical profession, to be found immediately after the table of contents, shows that the number of names in this edition is 52,558, being 1,405 more than in the last. All areas show increases. London has 367 more names, the Provinces 515, Wales 51, Scotland 130, and Ireland 145. The section relating to practitioners registered in this country but living abroad has 275 more names. The only section in which there is a decline is that for the Services, where the total has dropped again, this time from 3,283 to 3,205. Excluding these and the "abroad" entries, nearly one-fifth of the practitioners whose names appear have addresses in the wide London postal area. The directory of dentists which used to form part of this volume was removed two years ago, and the publishers now issue it separately. A section on the spas and climatic health resorts of the British Isles and of New Zealand is again contributed by Dr. R. Fortescue Fox; this appears among the introductory matter. The "late list" (new names and recent changes of address) follows items of miscellaneous information at the end of the directory. Of the work as a whole we need only say that the very high standard of accuracy in previous issues appears to be maintained, and we shall be surprised if daily reference to it during the next twelve months brings to light any errors for which the editors or printers are responsible.

[10] *The Law Within*. By Sir Bampfylde Fuller, K.C.S.I., C.I.E. London: Kegan Paul, Trench, Trubner and Co., Ltd. 1926. (Demy 8vo, pp. viii + 295. 12s. 6d. net.)

[11] *Nomogenesis or Evolution Determined by Law*. By Leo S. Berg, D.Sc. Moscow. With an introduction by D'Arcy Wentworth Thompson. Translated from the Russian by J. N. Rostovtsow. London: Constable and Co., Ltd. 1926. (Demy 8vo, pp. xviii + 477; 33 figures. 28s. net.)

[12] *The Medical Directory*, 1927. London: J. and A. Churchill. 30s. net.

THE HEALTH OF THE SCHOOL CHILD.

(*Concluded from p. 1071.*)

LAST week we gave an account of the first and more general part of the annual report of the Chief Medical Officer of the Board of Education on the health of the school child. We now propose to give some account of other parts of the report.

MEDICAL TREATMENT.

There has been during recent years a steady growth in the amount of treatment provided by local education authorities for the common defects, and with this there has been a tendency to widen the scope of treatment. The determining factors have been the needs of the children, the presence or absence of existing facilities for treatment, the possibility of treatment by the private medical practitioner, and finance. New schemes are submitted to the Board of Education; present-day financial conditions require a strict scrutiny of the money available, both local and national. Thus it may happen that the Board is unable to approve proposals which, however desirable, are too costly, and the needs of large numbers of children are still unmet. This is particularly true of conditions where prolonged treatment is required for special defects, and there it is thought voluntary funds should come to the rescue. Contagious skin diseases and external eye defects make up the bulk of the cases dealt with at minor ailment clinics. These minor ailments may do irreparable damage to sight and hearing unless treated early and continuously. Reports show a general decline of scabies and also of ringworm; but common impetigo has not decreased. The treatment of ringworm by x rays has been most effective, and some urban districts report that no cases exist.

Defective Vision.

Defective vision and its treatment swells the work of the school clinics as much as ever. This year a separate record shows that the cases of squint reported number no fewer than 26,402, or one-sixth of all the cases of defective vision. Note is made of the necessity for the early discovery of these cases of squint if there is to be satisfactory treatment. More attention is being paid to the need for making allowances for the children in the schools, not only by securing satisfactory lighting arrangements in classrooms, but also by modifying the curriculum where necessary to avoid eye-strain. The London County Council's regulations now prohibit the teaching of needlework by artificial light except when the school medical officer is satisfied that the artificial light is sufficient.

A hint of the importance of continuing to wear spectacles and not to abandon them at the end of school life is given in an interesting note by Dr. Joseph of Warrington in respect of 163 children for whom glasses had been provided and who had left school during the year. Among the 27 boys and 30 girls still wearing glasses there were *no* instances of unemployment, whereas out of 56 boys and 50 girls who had ceased to wear them 6 boys and 10 girls were unemployed.

Enlarged Tonsils, Adenoids, and Otorrhœa.

Enlarged tonsils or adenoids of a degree sufficient to require treatment are found in about 5 per cent. of unselected school children examined. The incidence differs widely in different places, but this may be due to variations in local standards. Local conditions, however, appear to have some influence, for the condition is more frequent in damp, low-lying districts than in warm, dry, and sunny parts. An illustration of an apparent increase is recorded in London, where the number of routine cases referred for treatment rose from 8,944 in 1924 to 12,876 in 1925—an increase of 44 per cent. This was due partly, not to an increase in the prevalence and severity of the condition, but to an alteration in the standard of diagnosis and increased facilities for treatment, especially in-patient treatment. The total number of children treated by operation throughout the country during the year was 23 per cent. more than in the preceding year. The after-results of operation have been the subject of investigation by several school medical officers; the results as regards the unfavourable symptoms associated with the condition have been generally satisfactory.

medicine by their nihilistic attitude, which resulted in clearing away a mass of irrational empiricism, but unfortunately nothing was put in its place, and new devils entered into the chambers which were swept but not garnished. The editors of the volume under review believe that the modern developments of physiology and pharmacology are now adequate to provide a scientific basis for a large part of the art of therapeutics; their object has been to collect this information, and to this end they have enlisted some fifty contributors, including many of the best known leaders of the medical sciences in Germany.

The first few articles of the first part of the first volume are introductory and historical; one of the most interesting of them is by the veteran Professor H. H. Meyer, who writes on the importance of experiments to clinical therapeutics. He has watched the birth of pharmacology as a separate experimental science, and has himself played an important part in its development. He emphasizes the fact that although animal experiments are essential yet they remain incomplete unless linked up with clinical observations, and reminds the younger school of pharmacologists of the debt that science owes to the founders of pathological physiology, most of whom were clinicians.

Other interesting and even amusing articles are on senseless and harmful therapeutics, by Professor von den Velden, and on pharmacological impossibilities in therapeutics, by Dr. Oppenheimer. Both are written from the practical standpoint, and contain numerous examples from actual medical practice. Subjects on the border-line of pathology and pharmacology are dealt with in a series of articles. One by the late Professor Wassermann deals with the fundamentals of serotherapy and immunotherapy; in other articles are described the general principles of non-specific protein therapy, anaphylaxis, climatotherapy, balneotherapy, radiotherapy, electrotherapy, and the influence of exercise and diet on health. This list of subjects will serve to indicate the very wide field covered by the volume.

The second part of this first volume deals with the pathophysiology and therapy of each system in turn; lastly come a few articles on the relation of therapeutics to forensic and preventive medicine.

The general ideas which led to the compilation of this volume are excellent, for the amount of information collected is the best proof that a sufficient amount of accurate knowledge of the physiology of the body in health and disease exists to permit at least the foundations of a science of therapeutics to be laid, even though in many cases this knowledge is still insufficient, and only an empirical basis is as yet possible. This first volume is a well planned attempt to collect the data available to form a basis for rational therapy; it deserves careful study by all who are interested in the advance of therapeutics.

LATENT PULMONARY TUBERCULOSIS.

THE tuberculous lesions covered by the title of the book on latent pulmonary tuberculosis,[7] by J. RIEUX, include all those of the ganglio-pleuro-pulmonary system that cannot be shown by our present clinical methods nor by the discovery of tubercle bacilli in the sputum to be in a state of evolution. This definition necessarily includes abortive, quiescent, and regressive tuberculosis. The author is, however, interested not so much in following the retrogressive phases of a lesion that has once been open as in deciding on the activity or non-activity of a lesion that has never been clinically manifest. It is with the object of helping the practitioner to form an opinion on this point that the book has been written. We may say at once that the author has nothing new to contribute to the technique of examination; no infallible laboratory test to relieve the clinician of the responsibility of personal diagnosis; no wide generalizations by which every observation may be interpreted; his method is rather to inquire into the various means of diagnosis that are at present available, and to assign to each a particular value. With thirty-five years of experience in the French army behind him he is well qualified to do this.

His main thesis is that, with care, it is possible in a large proportion of cases to arrive at a diagnosis of latent tuberculosis. The means he employs are three: (1) clinical, in which particular attention is paid to the patient's past history and to the physical examination; (2) radiographical, especially photographs taken with a stereoscopic camera; and (3) biological, among which the cuti-reaction and the complement-fixation test figure most prominently; the former he prefers for children, the latter for adults. It is interesting to note the respect that the author entertains for the complement-fixation test. Unfortunately the weight he places on it is out of proportion to the evidence he can bring to support it. His argument appears to be this: because 85 per cent. of patients with open pulmonary tuberculosis give a positive reaction, and because there is good reason for regarding it as specific, is it not probable that any person suspected of tuberculosis who reacts positively to the test is actually suffering from the disease? This may appear to be a sound argument, but as yet it is nothing more. From experience, however, the author has come to regard a positive reaction in a suspected patient as extremely suggestive of active tuberculosis; a negative reaction, of course, is of much less importance. If he could only prove his case he would render the diagnosis of latent tuberculosis very much more simple.

[7] *La Tuberculose Pulmonaire Latente.* Par J. Rieux. Paris: G. Doin. 1926. (Med. 8vo, pp. xvii + 247; 12 plates. Fr. 36.40.)

NOTES ON BOOKS.

ONE of the "Psyche Miniatures" published in connexion with the quarterly journal of that name is on the subject of *Over-Population*.[8] Its author, Mr. P. SARGANT FLORENCE, is lecturer in economics at Magdalene College, Cambridge. It constitutes an inquiry into how far recent statistical and theoretic contributions fit into the Malthusian argument that population is necessarily limited by the means of subsistence, and is regulated by preventive measures of checks on birth rate and by the positive checks of misery and vice in increasing the death rate. The tendency of population is to respond to and outrun any increase in the means of subsistence, and this tendency is manifest in existing unemployment. The author favours the Malthusian theories of this tendency to over-population, and points out that Malthus's aim was to urge people to avoid the positive check on over-population, that led through misery to death, by using moral restraint, which was in his day the leading method of preventing births. Recent views of statisticians, such as those of Mr. Yule in his presidential address to the Royal Statistical Society in 1924, attacked the supposed correlation of birth rates with the use of preventive checks, and substituted variations in fertility as the important factor in limiting increase in population. Mr. Sargant Florence does not agree with this, and brings forward considerable evidence to illustrate his point that the great decline in birth rates of European countries is synchronous with the knowledge of contraceptives and birth control. He favours the view of those who urge a limitation of the families of the poor parallel to the existing limitation among the rich, and believes that the future curve of population will be affected by influencing the poor, just as the propaganda of Bradlaugh and Mrs. Besant affected the curve in the past by its influence on the middle classes.

Dr. CHANDLER wrote his little book on *Animal Parasites and Human Disease*,[9] not primarily as a textbook for the parasitologist, but as a readable volume which could be understood and appreciated by all interested in the progress of science and civilization. That he has been successful in his aim is shown by the fact that a third edition has been found necessary within eight years of the publication of the first. In style and substance it has changed little. The chapter on kala-azar has been revised, while the therapeutical portions of those dealing with sleeping sickness and dysentery have been modernized. Recent work on the treatment of hookworm disease and on the biology of the flukes has been incorporated. Otherwise the third edition is unchanged save for minor corrections; there are still a number of these to be made, however, and the references should be brought up to date. Nevertheless, the volume remains a useful survey of human parasitology, and no better elementary textbook can be recommended.

[8] *Over-Population: Theory and Statistics.* By P. Sargant Florence. Psyche Miniatures: General Series. London: Kegan Paul, Trench, Trubner and Co., Ltd. 1926. (4 × 6¼, pp. 66; 1 figure. 2s. 6d. net.)

[9] *Animal Parasites and Human Disease.* By Asa C. Chandler, M.S., Ph.D. Third edition, revised. New York: J. Wiley and Sons, Inc.; London: Chapman and Hall. 1926. (Med. 8vo, pp. xiii + 573; 254 figures. 22s. 6d. net.)

British Medical Journal.

SATURDAY, DECEMBER 11TH, 1926.

THE NOMENCLATURE OF PARASITOLOGY.

NEARLY sixteen years ago (December 24th, 1910, p.1989) the BRITISH MEDICAL JOURNAL drew attention to the chaotic state of zoological nomenclature, especially as it affected medicine, and stated that: "What the mass of zoologists want is a system which will secure stability, which will obviate the necessity for antiquarian research, which, at the same time, will reject enigmatical descriptions, and will insist on the reference of all species to a central authority." It is interesting to note that Professor R. T. Leiper, F.R.S., in his presidential address to the Section of Tropical Diseases and Parasitology of the Royal Society of Medicine (which is reported elsewhere in this issue), expressed the view that zoological nomenclature as applied to medicine is producing the utmost confusion, and interfering to a very considerable extent with the teaching of the subject. In 1910 we stated that "assiduous individuals have spent their days and nights ransacking musty archives and long-forgotten tomes. From these they have extracted a galaxy of paradoxically new yet old names which they have tacked on to the familiar friends of our youth." These archaeo-parasitologists are still busy, not only in helminthology, as has been so vividly demonstrated by Professor Leiper, but in all those ancillary medical sciences which come under the control of the biologist. We have all learnt that the virus of yellow fever is carried by the mosquito *Stegomyia fasciata*, yet we read nowadays that the vector is *Aedes aegypti*. We are acquainted with the helminthic parasite *Filaria bancrofti* and its association with elephantiasis, yet we are disconcerted to learn of a disease, which seems very similar, caused by *Wuchereria wuchereria*, and it is only after considerable research that we discover that the second of each of these combinations is but a new name, the old having been changed, not by deed-poll, but by the activities of the excavators.

The cause of this confusion is the "law of priority" of the International Rules of Nomenclature, which, strictly applied, causes names in forgotten tomes and buried minutes to be resurrected and foisted on an unwilling body of workers. The law is, however, somewhat peculiar in its application. Old writers habitually wrote in Latin, and their latinized popular vernacular names necessarily resembled in outward form the binominal system, although, in fact, their users had no intention of being thus understood. Thus, for example, an old writer, Werner by name, wished to describe a round-worm from the dog, and he called it the lumbricoid of the dog, or, in Latin, *Lumbricus canis*. This has been seized upon by our excavators and hailed as a specific binominal combination, which, as anyone can see, it is not. And yet our ultra-modern textbook writers have adopted it without inquiry, and rendered nomenclature even more confounded. A similar state of affairs exists among the spirochaetes, although a recent authority has simplified matters by abruptly discarding all the fancy names and placing the whole lot in the one old well known genus. The fungi are similar, and a spate of new generic names, hailing from America, threatens to reduce bacteriology to a state of utter confusion; yet the astonishing plethora of letters and strains, of paras and pseudos, makes that subject sufficiently complicated for the ordinary reader.

Surely this is all unnecessary. After all, the name is of little value by itself, provided we can understand its connotation. Professor Leiper has suggested two alternative remedies: either we should adopt a special medical terminology for the parasites of importance—a course which is open to obvious objections and should only be adopted if the second fail—or we should stabilize the well known names of the parasites without regard to the law of priority and without reference to ancient minutes and abstracts, or to modern descriptions and paragraphs which form the source from which many of these replacement names have been taken. Professor Leiper appears to suggest that some independent body might be willing to undertake the duty of preparing an agreed list of names of parasites, animal and vegetable, in consultation with medical teachers and writers, so that harassed readers, and teachers also, may escape from the labyrinth wherein the nomenclators have cast them. This could be done with the active co-operation, where found desirable, of zoologists and botanists, who even now have the power under the international rules to insist that, where these rules operate too arbitrarily and cause too much confusion by their strict application, exceptions should be made. This has already been done in some instances, and there is no reason why the creation of such a list of "fiat" names should be beyond the forensic powers of our biological and medical legislators. We fear, however, that Professor Leiper's plea will bring him neither tranquillity nor peace, unless it be that of the spirit which rides the storm.

POLIOMYELITIS IN INSTITUTIONS.

THE controversy in the public press regarding the measure of dispersal adopted at Uppingham School for dealing with the occurrence of cases of poliomyelitis there, and the recent occurrence of cases at the Royal Military Academy, Woolwich, has brought into prominence the divergent views of members of the medical profession on the question of dispersal or isolation of institutions when cases of this nature arise. The latter method has been adopted at Woolwich, as it was in boarding schools at Broadstairs, but the Uppingham and Woolwich conditions are not exactly comparable. Poliomyelitis is more widely spread than usual throughout the country, and isolated cases are occurring from time to time in many places. It is not surprising, therefore, that one or two schoolboys at Uppingham and cadets at Woolwich should have acquired the disease.

The first case at the Royal Military Academy occurred at the end of October. The early symptoms were those of mild influenza, but on the development of paresis of the palate an examination was made of the throat exudate at the Queen Alexandra Military Hospital, Millbank, when a micro-organism similar morphologically to the bacillus of diphtheria was isolated, although no culture was obtainable. The patient was accordingly sent to the London Fever Hospital as a case of diphtheria, but eventually, after a further extension of the paresis, the diagnosis of poliomyelitis was made. In the meantime a cadet at Woolwich belonging to the same term, who had been in constant association with the first case, although each had a separate room, was admitted to the cadet

A careful analysis of 85 cases followed up after operation by Dr. Cramb of Brighton gave the encouraging result that deafness was cured in 38.5 per cent., and otorrhoea in 90.3 per cent. Experience showed that the principal practical points were:

1. That enlarged tonsils and adenoids may be focal sources of serious infection and therefore require careful attention.
2. That slight conditions do not require operation and should be otherwise treated.
3. That after operation patients should be detained in hospital for at least one night.
4. That following up and supervision are needed in all cases.

For the treatment of otorrhoea by ionization, provision has been made by twenty-six authorities. In London six special centres have been formed. An analysis of 602 cases treated by ionization in eight representative areas shows that 415, or 68.9 per cent., were cured during the year. An excellent account of this method of treatment is supplied by Dr. Alfred Friel, assistant aurist to the London County Council; it should be read by every school doctor and clinical assistant in the aural departments of hospitals. There can be no doubt of the advantage of the successful treatment of these cases of discharging ears. Not only is a most disturbing and foul-smelling discharge removed, but other and greater risks are avoided. The aural surgeon to the Leicester education authority comments upon the decreasing number of cases of mastoid disease largely owing to this increasing care and attention.

"The number of mastoid operations this year was only 13, a further diminution as compared with 1924, when it was 18, and a very considerable difference if we turn back to 1921, when 61 mastoid operations were done. It is doubtful whether the number of these major operations will become still less, considering the large numbers of chronic discharging ears that are always under treatment."

Crippled Children.

There has been a considerable development during the past year of schemes for the treatment of crippling defects, including provision for hospital treatment, and for after-care clinics, in 85 areas. But there is still need for a great increase in hospital accommodation if crippled children are to be dealt with in comprehensive fashion. It is not practicable to form a national estimate, but local authorities should not find it difficult to ascertain local needs. The problem is not only that of the school child. A large proportion of the crippling has its origin during earlier years, and any effective scheme must take into account children under 5 years of age. The success that has attended the use of heliotherapy in the treatment of certain conditions, especially of rickets, of lupus, and of bone, joint, and glandular tuberculosis, has led to the trial of artificial sunlight for these cases. The biological action of the ultra-violet rays is at present only imperfectly known, but so far experience has shown that the radiations are beneficial in these cases of surgical disease, also some skin conditions and certain cases of general debility. Some account is given of the use of the rays in certain areas. Note is made of some of the risks involved—for example, burns, eye affections, blood changes, unsuitability to febrile cases, liability to headache, nausea, and fatigue. There is much work to be done before it can be held generally suitable for school clinics.

Summing up the section on medical treatment, it is said:

"No new form of treatment is sanctioned by the Board which infringes the principles which have from the commencement governed this work, and to which reference has frequently been made in these reports, viz., that the treatment cannot be better provided otherwise, that it is the most economical method, that due regard is paid to existing facilities and private medical practice, and that the convenience and welfare of the children, as well as the responsibility of parents and authority, are considered. It is obvious that the continual growth of school clinics calls for vigilance to secure that they do not become mere out-patient departments with their manifold disadvantages and that the treatment provided, whether by general practitioner or whole-time officer, is effectually supervised."

The School Building in Relation to Health.

There is a most interesting section on the effect upon health of the school premises. In the earliest days of organized provision of school buildings the one and only guiding principle to which the architect had to work was that furnished by the educationist, but there has since been a steady and increasing influence of ideas of health upon design. Edwin Chadwick, in a small pamphlet published nearly sixty years ago on *Sanitary Principles of School Construction*, showed a modern appreciation of the social and health side of school work. The plan of central hall and surrounding classrooms lent strong support to mechanical systems of ventilation, which were indubitably better than the earlier schools. But mechanical effects had their disadvantages, and these systems have given place to natural ventilation. About 1910 there came the pavilion or cross-ventilated type, the first of which was built by the Staffordshire local education authority at the suggestion of the late Dr. George Reid. The soundness of the principle of the plan was at once recognized, and since then it has become the dominant plan of school building. Of existing buildings it is stated that it is common knowledge that many fail to reach a minimum standard of sanitation and suitability. The Board has recently carried out a survey of elementary schools, with the result that 664 were classified as unsuitable and incapable of improvement, but that a larger number might be reconditioned. Defects pointed out are often of a character that would require little cost to remedy—far less than a new school—and in some cases no expenditure at all, merely the more intelligent use of existing accommodation and appliances.

Special Schools.

The report contains a very lucid account of the curriculum of the blind school written by Dr. Eichholz. It is found that there is sufficient accommodation for blind children, but not enough for the partially blind, and no general arrangements for the after-care of the partially blind. In London, however, of 437 children who left the myope classes in 1921 and 1923, as many as 304, or 69 per cent., were known to be employed; and 49, or 11 per cent., were unemployed but employable; 20, or 5 per cent., were under further training; of 64, or 15 per cent., no record was procurable. In a summary of conclusions on the training of the blind, it is stated that a "main requirement" is "Provision of residential accommodation in preference to day schools for blind scholars of all ages—in the interest of true nurture of health, and of outlook and proper setting for educational training."

This sweeping statement is in striking contrast to the finding with regard to the education of mental defectives. For these no such stereotyped generalization is advocated. We read:

Experience in this country, and indeed elsewhere, also suggests that the "special school" is not the only, nor always the most effective, way of extracting and developing citizenship out of unlikely material. For the worst type of case it is not proving as serviceable as was formerly believed. In such cases custody, occupation, and segregation are generally necessary. For the higher grade defective special educational training is, however, the obvious development. In the rural districts where institutional training is impracticable or unavailable, much may be done by domestic supervision and employment in suitable forms of agricultural labour. *Each case must be adjudicated on its merits*, and patient, intensive, and experimental methods are our only hope, followed up by consistent after-care.

The italics in this passage are ours; the statement italicized should be related to the generalization thought desirable for the blind.

Conclusion.

In concluding his report, Sir George Newman gives an answer to the question he put at the beginning: Is the service worth the cost? He concludes that it is. In the year two and a half millions of children were medically inspected, a million cases of defect were treated, three-quarters of a million more had dental treatment, all the children in the schools have been regularly supervised as regards personal cleanliness, and in every area much has been done to encourage good habits and good physical training. "All this cannot have been without beneficial effect. Indeed, we can specify more exactly what the effect has been." Scabies, rickets, and ringworm are vanishing. Gross forms of deformity from malnutrition and congenital syphilis are rare. And on the positive side the child who is leaving school at 14 is better physically in every way than was the "leaver" of twenty years ago, and this child is less handicapped than formerly in obtaining and keeping employment. The prompt treatment of ailments has improved school attendance, and the mental "educability" has been raised. Another unlooked-for result is the better appreciation of fresh air. The English people are becoming an open-air race.

statistics. The simple fact is that enough is not known of the etiology of diabetes to enable these statistics to be fully analysed. Years ago it was pointed out that statistically diabetes was increasing; various attempts have been made to associate this increase with that of cancer, but they have not thrown any light upon the subject, yet Mr. Coleridge has not refrained from handling the statistics in the crudest possible manner. Etiologically considered, diabetes is an unsolved epidemiological problem, but ignorance of one side of a problem must not be made an excuse for denying that we have knowledge of a different aspect of it—the clinical. Dr. Elliott and Sir Walter Fletcher term this appeal to ignorance "pitiable casuistry." That is too charitable a judgement. Casuistry requires some intellectual subtilty. This is the *ignoratio elenchi* of a schoolboy set out in pompous language. It is shown by the direct clinical observations of independent physicians, basing themselves upon a statistically adequate number of instances, that a particular method of treatment is successful. No attempt is made to refute those observations by the submission of similar clinical statistics pointing to a different result. Instead, statistics relevant to a totally different issue are produced.

What would a judge say to a prosecuting counsel who attempted to refute specific evidence that the prisoner at the bar had not committed a particular murder by quoting statistics to show that undetected crimes of violence are increasing?

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

A MEETING of the court of governors of the London School of Hygiene and Tropical Medicine, when Sir Holburt Waring, chairman, presided, was held on December 7th in the Council Room of the House of the British Medical Association. A unanimous vote of condolence with the widow of Dr. J. C. McVail was passed. The second annual report of the board of management included a detailed description by Dr. Andrew Balfour (director) of the work of the tropical division for the year ending July 31st, 1926. The average number of students each term had been rather higher than in the previous year, and the total was satisfactory in view of the increased length of the course and the higher fee. Emphasis was laid on the necessity of safeguarding the clinical side of tropical diseases at the school, inasmuch as the Seamen's Hospital Society might not continue to maintain the hospital at Endsleigh Gardens for more than a limited period. If and when it was closed the school would be deprived of the long-existing facilities for clinical and pathological study. The Minister of Health had appointed a committee with broad terms of reference, under the chairmanship of Sir Alfred Mond, to consider how the emergency might be met. The board had decided to apply the capital of the Milner Research Fund, as well as the income, to the extension of research work. On the invitation of the Royal Society the board had nominated Dr. A. W. Grace, a former student of the school, to undertake research in the West Indies into the bacterial complications of filariasis. Towards the cost of this expedition the school was making a contribution out of the Milner Research Fund of £500 a year for a period of two years and possibly more. It was announced that the work of the Institute of Agricultural Parasitology was being expanded under the direction of Professor Leiper, and that Winches Farm was nearing completion as a field station, the cost of maintenance of which would be met out of funds provided by the Development Commissioners at the instance of the Minister of Agriculture. Sir William Hodgson suggested that this important side of the research activities of the school might be further extended, and that some aspects of foot-and-mouth disease might be considered. The chairman stated that the deficit taken over with the London School of Tropical Medicine on August 1st, 1924, had now been entirely wiped out, partly through an extra grant of £5,000 a year from the University Grants Committee, and partly by a generous donation from the executors of the late Mr. Alfred de Rothschild. Warning was given that the work of the tropical division would be inevitably carried on at a loss if the amount of available Exchequer assistance remained at £2,200, unless there was a substantial increase in the endowments and annual subscriptions; additional funds might, perhaps, be obtained from colonial Governments and commercial sources. Representations had been made through the Minister of Health to the Treasury early in 1925 that the commitment of £25,000 a year entered into by the Government at the time of acceptance of the gift from the Rockefeller Trustees would fall far short of the requirements of the staffing and upkeep of the school when fully functioning in the new building. The organization of a great graphic museum is in the hands of Sir Wilfred Beveridge. An account of the proceeding on the occasion of the laying of the foundation stone of the new building by Mr. Neville Chamberlain, which we reported on July 10th (p. 75), was presented to the court of governors. It was announced that the progress in building had been seriously delayed by the dispute in the coal-mining industry, but Sir Walter Fletcher announced that the Education Committee was exploring a possibility of commencing the teaching of hygiene in temporary premises, in view of the demand for trained research workers manifested in the proceedings of the recent Imperial Conference, a demand to meet which the school was primarily established.

RHEUMATIC INFECTION IN SCHOOL CHILDREN.

IN his annual report for 1925 the Chief Medical Officer of the Board of Education returns to the subject of rheumatism in school children, which was afforded considerable space in the volume for the previous year. As usual, the report deals particularly with the work of the school medical service, and we do not look in vain for information such as could be gathered only by such a service. Several eminently useful facts are noted. Dr. Menzies, for instance, estimates that there are not fewer than 10,000 school children in London who are suffering, or have suffered, from rheumatic symptoms, and that from 600 to 700 children are absent from school for long periods on account of this infection. These figures represent 25 per cent. of the chronic invalidity among children. Again, we learn that over 1,000 children suffering from rheumatism and heart affections are being educated in the London schools for the physically defective. An inquiry addressed in respect of thirty open-air day schools elicited the verdict that rheumatism of any severity was unsuitable for treatment on such lines—a conclusion that most workers in metropolitan hospitals will endorse. When we consider the problem of the early detection of rheumatism and the prevention of heart disease, we must own that the assistance given by the school medical service is at present very slight, and the number of cases detected and referred to hospitals by it extremely few. This is due largely to the infrequency of the periodic examinations made. In the report for 1924 there were laid down (pp. 104-107) some excellent suggestions for local education authorities whereby an improvement might result. In the present report these suggested "lines of action" are repeated, and "considerable advance" along them is reported. Further details would have made pleasant reading. The problem of rheumatism among the children of this country is a large matter, and to set going any organized scheme of prevention on a big

hospital with influenzal symptoms on November 4th; on the appearance of paresis of the arm and leg the case was diagnosed as one of poliomyelitis and transferred to Queen Alexandra's Military Hospital. No other case occurred until November 21st, when another cadet, also of the same term, developed symptoms of influenza when at home on week-end leave. He returned to Woolwich on November 26th, and was placed in hospital under observation. Three days later he developed slight paresis of the deltoid, and the diagnosis of poliomyelitis was made. Since then another case has occurred in Edinburgh in an officer of a battery that was transferred from Woolwich on November 10th.

The measures taken from the first by the army medical authorities followed the usual lines on the occurrence of infectious disease of this nature, but more extensive restrictions and isolation have been enforced after a consultation last week with members of the Army Medical Advisory Board and the Hygiene and Pathological Committees. The cadets and staff are confined as far as possible to the academy grounds. Rugby football and other recreations involving crowding together are stopped, and cadets are not allowed to work in one another's rooms. With the exception of the first-term cadets, who have a comparatively large room for every two, the cadets have each a separate room. All feeding utensils are sterilized after use. There is a daily medical inspection by the officer of the R.A.M.C. in medical charge; and each cadet has to gargle thrice daily with 1 in 5,000 potassium permanganate in normal saline solution. Football matches and competitions of every kind with other institutions have been cancelled. These indicate the general measures adopted for isolating the institution from the outside community and for preventing spread of infection within it. Although cadets are thus restricted to the academy grounds, we understand that parents have been informed that, if they so desire, they may remove a cadet to his home, but are recommended not to do so.

Epidemics of poliomyelitis among young adults in military institutions are not uncommon, and in the years before the war were of considerable gravity in some Continental barracks, so that the importance of thorough measures for dealing with early cases in institutions such as the R.M.A. and R.M.C. should not be minimized. The age of the cadets is roughly that of university undergraduates; there are 205 at present at the Royal Military Academy, and 465 at the Royal Military College, Sandhurst, where similar restrictions have been imposed in order to prevent risk of infection being introduced from the local civilian population, amongst whom three cases have been reported. There is, however, nothing in the extent or nature of the cases that have occurred either at Uppingham or Woolwich to create alarm, although the publicity given to them has had the effect of perhaps exaggerating their importance. Fortunately we are at a season of the year when the incidence of the disease usually declines.

MR. COLERIDGE ON DIABETES.

IN *The Pilgrim's Progress* we read of certain giants, one of whom has been dead many a day, "and as for the other, though he be yet alive, he is, by reason of age, and also of the many shrewd brushes that he met with in his younger days, grown so crazy and stiff in his joints, that he can now do little more than sit in his cave's mouth, grinning at pilgrims as they go by, and biting his nails because he cannot come at them." There was, perhaps, a time when the antivivisection giant was more formidable to pilgrims than he is to-day, when there was a real risk that the progress of knowledge might be arrested at the bidding of this giant, but that was a good many years ago, and Mr. Stephen Coleridge's revival of the old play (in the *Times*) is instructive without being successfully offensive. The assumption that men of science have no sympathy with or affection for dogs needs no comment, but Mr. Coleridge's reasoning about the value of insulin in diabetes merits a few words of amplification. "I harbour the belief," he writes, "that if a treatment fails to lower the death rate per million living persons it cannot be doing any good as a means of preventing people from dying of a disease."

Let us see where this aphorism leads us. Many years ago the surgical treatment of cancer of the breast was one of the gloomiest pages in our textbooks. Thanks to Halsted and other great surgeons, the technique of the operation was revolutionized. Halsted believed that when cases were treated early 75 per cent. of the patients might live three years. Many thought this too good to be true. We now know it to have been a modest estimate. Within the last year an official report on experience in this country[1] has recorded that as many as 90 per cent. may survive, not three, but ten years—results which are, as the author says, "at once a challenge to pessimism and a stimulus to efforts to secure operative treatment at the earliest possible stage of the disease." But the death rate from cancer of the breast is not falling, it is rising. The inferences the ordinary educated man would draw (even the ordinary antivivisector, for the surgery of the breast is the business of surgeons, not of hard-hearted Fellows of the Royal Society) are, first, that the actual incidence of cancer of the breast may be increasing; and second, that the proportion of sufferers who reach the surgeon's hands early enough to be effectively treated is still too small to influence the total mortality. These conclusions would lead him to spread abroad the knowledge of what surgery can do, in the hope that lives now sacrificed might be saved. But, according to Mr. Coleridge's logic, all this is foolish. The Registrar-General's figures show that cancer of the breast is increasing; we must therefore "harbour the belief" that Halsted was a self-deceiver, that the evidence published by the Ministry of Health is worthless, and that the less women with cancer of the breast have to do with the surgeon the better, for the death rate has not been lowered. *Per contra*, we shall perhaps infer that as infant mortality since 1918 has never regained the pre-war level, the best means of infant welfare are great European wars.

But, in fact, this kind of statistical "reasoning," farcical as it is when applied to a surgical instance, is not so absurd as in the instance of diabetes. There has been a certain regularity of increase in the death rate from cancer of the breast. But the death rates from diabetes have fluctuated in a manner which statisticians have not yet explained. There have been changes which can in no way be related to methods of treatment. Dr. Stevenson[2] has called attention to the changed relation of the sexes. Before 1920 the death rate on males was always higher than upon females; since 1920 this has been reversed. Dr. Young and Mr. Russell[3] note other peculiar features of the

[1] *Ministry of Health: Reports on Public Health and Medical Subjects, No. 34.* A Report on the Late Results of Operation for Cancer of the Breast. London, 1926.

[2] *The Registrar-General's Statistical Review of England and Wales for the Year 1924.* Text, pp. 66-67.

[3] *Quarterly Journal of Medicine*, vol. xx, 1926. Pp. 87 et seq.

however, to warn us not to make accident incidence *per se* a measure of accident proneness. They note also that at present the reliability of the tests they used has not been established, and that until this is done the tests cannot safely be used for prognosticating the accident proneness of individuals. It will be seen, therefore, that the matter, like some other subjects under consideration by the Industrial Fatigue Research Board, is still in the pioneer stage. With further study it is possible that the ideal of the investigators may be attained, and arrangements may be made to place unsafe persons in occupations involving the minimum of risk to themselves and others. But the ordinary man, we expect, will long continue to use the term "carelessness" in preference to "accident proneness."

FRACTURE OF THE NECK OF THE THIGH BONE IN ADULTS.

THE unfortunate elderly people who suffer fracture of the neck of the femur are in too many cases much to be pitied, for the pain and disability which attend upon it when not successfully treated are such as to embitter the evening of life and compel an otherwise sound person to become an invalid. The Section of Orthopaedics of the Royal Society of Medicine did well, therefore, to choose this subject for discussion at its meeting on Tuesday evening last. The subject was introduced by Mr. S. L. Higgs, and a number of speakers well qualified by their experience kept up the debate until a late hour. As regards treatment, two main questions presented themselves: first, what is the best routine treatment which could and ought to be followed by practitioners in general; and, secondly, what is the best course to pursue in a hospital equipped with the necessary skilled staff and appliances. The balance of opinion was in favour of Whitman's method of full abduction, traction, and rotation inwards, maintained by a long plaster-of-Paris spica in the first case, while there was a lesser approach to unanimity as to the ideal method of treatment in an orthopaedic hospital or department. Mr. Hey Groves, whose work in this connexion and whose recent lecture before the Royal College of Surgeons are well known, advocated open operation and fixation of the fragments with beef-bone pegs, for only by exposing the site of injury to ocular inspection can one be sure that the fragments are not separated by soft tissues, which complication is so fruitful a cause of non-union in the fracture of the patella and other bones. There seems little doubt that in fracture of the neck of the femur, as in others, the most important and the commonest cause of non-union is the separation of the fractured surfaces from one another. Since the introduction of radiography we are in possession of knowledge as to the position of the fragments which was unobtainable a generation ago, but, as was pointed out, the information so given is imperfect, and it is only by the use of the stereoscope that we can obtain any knowledge of the relative position of the fractured surfaces in an antero-posterior plane. Thus an appearance of impaction may be conveyed by the shadows of structures which may actually be separated by an inch or more. Similarly, we may be deceived into assuming that almost complete absorption of the femoral neck has occurred when its disappearance is really in whole or in part due to external rotation of the femur. No speaker maintained that these injuries are in general well treated in our great teaching hospitals, but speaker after speaker, some of whom are on the staffs of such hospitals, admitted that if treated at all they were not so dealt with as to instruct students and future practitioners in efficient, up-to-date methods. Unfortunately, this reproach is too widely justifiable as regards fractures in general, as well as regards this particular injury. It is also worthy of remark that the bugbear of surgeons of thirty years ago—hypostatic pneumonia and the dangers of prolonged recumbency in elderly patients—is no longer feared. Such scant reference as was made to it consisted in its dismissal as a baseless fear. Better methods of nursing and dieting, as well as improved orthopaedic appliances, are probably to be thanked for this.

STANDARDIZATION OF DISINFECTANTS.

AN addendum to the report of the Medical and Health Department of Western Australia for 1923-24 presents an account of the examination of certain disinfectants by Dr. John Dale and Mr. J. G. C. Campbell. The work, which includes both chemical and bacteriological tests, was carried out in the laboratory of the Public Health Department at Perth, W.A., during the year 1921 on a series of disinfectants tendered by manufacturers for hospitals and Government departments. They were chiefly coal-tar preparations of the emulsifying and non-emulsifying groups. In their bacteriological tests the authors adopted the suggestion of Chick and Martin to test germicidal power in the presence of organic matter. They found that its efficacy was enhanced by sewage and not obviously depressed by 50 per cent. urine. Blood serum in 50 per cent. concentration produced only a slight depreciation of germicidal power, and pus a more marked one. A control series of tubes containing a standard disinfectant was included in each day's experiments. Carbolic acid was used as the standard at first, but was discarded later in favour of sanitas sypol, a preparation containing 50 per cent. phenol. Among the conclusions reached are that cresol soap solutions are effective in proportion to their content of phenols as shown by chemical analysis, and that the presence of organic matter calls for an increase of strength. The ratios of increase are: for pure carbolic acid 1.4, for cresol soap solutions 2.4, and for emulsions 8.2. The coefficients found for the coal-tar disinfectants and their depreciation factors are stated in tabular form. Chick's observation that the depreciation of the emulsifying group is much greater than that of the non-emulsifying group is confirmed. No information is given as to the purity of the phenol contained in sanitas sypol. Had the authors used absolutely pure phenol at first they might possibly have retained it as a standard in preference to a member of the lysol class. This painstaking and thorough investigation has rendered useful service by confirming certain conclusions reached by previous workers. It should prove of much value also by affording guidance to the Government of Western Australia and others in the choice and purchase of suitable disinfectants. In some instances it does not sustain the claims made by advertisers.

HEALTH OF ALL NATIONS.

THE Health Committee of the League of Nations, which was appointed on a three years' mandate, held its concluding regular session at Geneva last month. From the reports submitted to it by the special commissions to which it had remitted inquiries on various health problems some interesting features emerge. The Cancer Commission has established that the differences of mortality from cancer of the breast and uterus observed in different countries are genuine, and are not to be explained by local differences in diagnosis, registration, and the like. It has found no association between race and cancer mortality in certain European countries investigated. It thinks that the efficacy of early operation should be more generally recognized. The Permanent Standards Commission, which has studied the question of international agreement on methods of determining the activity of biological products, reports that for antidiphtheria serum the national standards are now identical. For antitetanus serum the international unit is defined as double the American unit,

scale will take both time and patience. Yet it is all to the good that the gravity of the infection as a national disease is increasingly recognized, and we do not doubt that as the medical profession as a whole, and the hospitals in particular, set about to deal with the disease with greater stringency, the school medical service will rise to the occasion and give valuable aid in co-operating with them.

TREATMENT OF CANCER BY LEAD.

WE publish elsewhere in this issue (p. 1135) a note by Dr. R. G. Canti of the observations he made while attending in Liverpool a demonstration given last week of the method of treating cancer by lead. Similar demonstrations, some of them extending over a longer period, have been given on several occasions, and one of these Dr. Canti had attended, so that he was prepared to take full advantage of the rather strenuous programme planned by the Liverpool Cancer Research Organization for Tuesday, November 30th. It had been arranged in order to meet the convenience of a deputation from the Executive Committee of the British Empire Cancer Campaign, and Professor Blair Bell was good enough to invite the BRITISH MEDICAL JOURNAL to send a representative. We are much indebted to Dr. Canti for consenting to accept this invitation on our behalf. The deputation consisted of Mr. P. Lockhart-Mummery (chairman of the Executive Council, Sir C. Gordon-Watson (chairman of the Preliminary Inquiry Committee), Professor Lazarus-Barlow (chairman of the Intelligence Committee), Sir William Willcox and Mr. Sampson Handley (members of the Executive Committee), Dr. Hopwood (Professor of Physics in St. Bartholomew's Hospital Medical College, and a member of the Radiology Committee) and Mr. E. J. C. Chapman (secretary). The deputation will make its report to the Scientific Advisory Committee, which will in due course transmit it, with any observations it may deem proper, to the Grand Council of the Campaign, and not until that body has considered it will anything be published. We are informed, however, that all the members of the deputation were impressed by the sincerity of the work, and formed the opinion that relief had been given to a considerable number of sufferers. The principles upon which the treatment rests, the histological changes found in cancerous tissues treated with lead, the clinical effects of lead, and the nature and purpose of the Liverpool Cancer Research Organization, were fully described in the report of the proceedings on the subject in the Section of Medicine at the Annual Meeting of the British Medical Association this year, published in our issue of November 20th (p. 919). We understand that arrangements are being made at St. Bartholomew's Hospital for carrying out further researches into the efficacy of lead in cancer.

RADIUM AND UTERINE CANCER.

THE London Association of the Medical Women's Federation has established a Cancer Research Committee, and its work during the first six months of its activities has been recorded in a report to the British Empire Cancer Campaign, entitled "The radium treatment of cancer of the uterus." Deaths from cancer of the uterus number more than 4,000 a year in England and Wales alone. In February, 1925, the women's committee was lent 300 mg. of radium bromide by the Medical Research Council. The work has been carried out under a subcommittee of all the members of the gynaecological staffs of the women's hospitals co-operating. A summary of the work already done in this connexion, which has from time to time been recorded in the pages of the JOURNAL, is followed by a useful bibliography. It was decided to choose so far as possible cases of cancer of the cervix for treatment, since the disease is localized for some time at the site of origin, and in comparatively few instances are the pelvic glands invaded. After discussing the various modes of application, the reasons for the choice of the methods in favour at the Radium-Hemmet, Stockholm, are given. In it cross-radiation is obtained. One or two tubes are inserted into the cavity of the uterus, and are supplemented by radiation from applicators placed in the vault of the vagina. Not the least of the advantages of the method is that it can be applied in many cases without a general anaesthetic, with trifling disturbance to the patient, and with no injury to the tissues other than that caused by the radium. Comparatively heavy doses of radiation were given in preference to weak doses, which, it is considered, have been shown to be not only ineffectual, but even harmful. After appropriate preparation of the patient and disinfection of the parts, the radium is inserted and kept in place by a firm gauze pack, which also serves to protect the vaginal mucous membrane and prevent too close contact of the radium with the bladder and rectum. Three applications were made, the second one week after the first, and the third two weeks after the second. Each application lasted twenty-two hours. The total dose varied between 5,000 and 7,500 mg. hours. An account is given of 42 cases of carcinoma of the cervix so treated. Of these, 29 were inoperable cases: 6 cases had completed treatment only recently; 14 treated for six months are symptom-free, and no local disease is apparent; 4 are symptom-free but evidence of disease is present; 4 are going downhill; 1 died three months after radiation without recurrence of local symptoms. Headache is complained of by the majority of the patients, but it is not severe; nausea and vomiting, chiefly after an anaesthetic, were observed, but the vomiting ceased immediately the radium was removed. There is transient rise of temperature, and diarrhoea is common. In one case there was pyometra, and in another peritonitis due to an abscess. This report on radium treatment, together with similar communications from other organizations, is included in the annual report of the Medical Research Council on the medical uses of radium, of which an account is given on page 1136 of this issue.

"ACCIDENT PRONENESS."

REPORT No. 38 of the Industrial Fatigue Research Board is a "Psychological study of individual differences in accident rates," by Messrs. Eric Farmer and E. G. Chambers, investigators to the Board. The investigations were made on 611 boy apprentices employed in naval dockyard or Royal Air Force shop work, and on 40 women engaged in manufacturing and packing sweets. The investigators came to the conclusion that inequality in accident liability among individual workers was not solely determined by external factors or by chance. In an appreciable degree the inequality was due to measurable individual differences. In the pursuit of the problem it was found necessary to coin and define several new terms. Accidents were more frequent in those with poor "aesthetokinetic co-ordination," a term invented to avoid the use of "sensori-motor" or "neuro-muscular," which have already well defined scientific meanings. Similarly, "accident proneness" is used to mean a personal idiosyncrasy predisposing the individual to a relatively high accident rate, while "accident liability" includes all the factors determining accident rate. Nervous instability was found to be related to frequency of accident, but no relation appeared to exist between accidents and the higher intellectual processes. There was slight indication that the accident-prone were industrially inefficient and more liable to report sick. The authors are contemptuous of those who say that accidents are due to carelessness, and who, when asked to define carelessness, leave little doubt that they simply mean having an undue number of accidents. They are careful,

LEAD TREATMENT OF CANCER.

ACCOUNT OF A DEMONSTRATION BY THE LIVERPOOL MEDICAL RESEARCH ORGANIZATION.

BY

R. G. CANTI, M.D.CANTAB.,

BACTERIOLOGIST TO ST. BARTHOLOMEW'S HOSPITAL AND LECTURER IN BACTERIOLOGY IN THE MEDICAL COLLEGE.

On November 30th, 1926, a demonstration was given at Liverpool to representatives of the British Empire Cancer Campaign and others interested in the lead treatment of cancer. After introductory remarks by Professor Blair Bell on the history of the organization and the rationale of the treatment, short addresses were given by Professors Dilling, Glynn, and Lewis, and Drs. Brooks, Cunningham, Jowett, and Millett, on their various subjects. The nature of the physico-chemical and pharmacological research at present being undertaken was fully entered into, and the details of the chemical manufacture of the lead preparation were fully demonstrated in the laboratories. Visits were made to the Royal Infirmary, the Northern Hospital, and to the laboratories and nursing homes in Rodney Street, where 49 cases had been collected for clinical examination. The histories of these cases were fully entered into, and the histological preparations (which are systematically taken), microphotographs, ordinary photographs, and radiographs of the cases were shown.

The organization has already been fully described elsewhere (BRITISH MEDICAL JOURNAL, November 20th), but it is to be noted that apart from some monetary help received from outside sources the investigation is to a large extent self-supporting. All fees collected from patients for consultations, operations, biochemical examinations, injections, and nursing-home accommodation are received by the committee, and this body defrays the expenses in connexion with both the clinical work and the laboratory investigations.

The co-operation and "team" spirit of the various workers in widely different fields were the admiration of those present, and it may confidently be said that this centralization of control and close co-ordination of workers has set an example to the whole country.

THE TREATMENT.

The rationale of lead treatment is now well known, and is based on Professor Blair Bell's work on the action of lead on the syncytial cells of chorionic villi. These cells have certain characters in common with malignant cells in that they are rapidly growing, and infiltrate the decidua and, in some cases, other tissues. The administration of certain of the heavy metals has long been known to produce abortion. Their action on pregnant does has been investigated at Liverpool, and it is claimed that lead has a specific action on the syncytium, causing necrosis and thus giving rise to abortion. Other metals, including copper, act in a different way—namely, by producing haemorrhage.

The analogy between new growth and chorion has given rise to the suggestion that lead might have a specific action on new growth. Subsequent investigations tend to confirm this, both from clinical experience and from the various chemical and pharmacological investigations, which show, *inter alia*, that after this treatment the new growth has a high lead content.

Technique.

The lead is introduced intravenously in the form of a coarse colloid suspension containing 0.5 per cent. of lead. In this form it has no immediate poisonous effect, and considerable quantities can therefore be introduced with safety. The lead becomes fixed in the various tissues; it is suggested that it acts by its gradual ionization, and that the most poisonous effects occur in those tissues where it has been fixed in largest quantities. This, while accounting for the necrosis in the new growth, is probably also the cause of the damage which may be produced in the liver, kidneys, blood, and certain other organs; and therefore before commencing treatment it is necessary to ascertain that these organs are not already the seat of any gross lesion.

Contraindications.

The more important contraindications are hepatic insufficiency, renal disease, advanced morbus cordis, marked anaemia, and wasting. Extensive preliminary investigations, chiefly of a pathological nature, are therefore carried out with a view to passing the patient as fit for treatment.

The Course of Treatment.

The treatment is spread over four or five months; ten or twelve doses are usually given, and the total quantity of suspension injected is 120 c.cm.—that is to say, 0.6 gram of lead.

In the course of treatment the patient suffers to a greater or less degree from lead poisoning, and in some cases this effect is so severe that it may be necessary that it should be controlled by the intravenous administration of calcium chloride. Much useful experimental work has been directed to a better knowledge of lead poisoning, which in itself is a matter of great importance, quite apart from the question of malignant disease. It is remarkable that, a few months after the treatment is finished, the patients lose all signs of the effects of lead, and look particularly robust and healthy.

RESULTS.

It is as yet too early to judge the results of treatment by statistical methods, but when the cases are critically examined it becomes evident that they must be divided into two groups:

1. Those in which the growth has been treated by lead and by no other means.
2. Those which have been treated by lead, and in addition by surgery or irradiation, or both.

It is obvious that only those cases which have been treated by lead alone are of real importance. The second class of case—namely, that in which other treatments have been employed, whilst clinically of great significance, are not of such value from a scientific point of view. For example, it is within the experience of most surgeons that from time to time when an avowedly incomplete operation is performed, the patient yet remains apparently well for a considerable time before there is any recurrence of signs.

CONCLUSIONS.

Remarkable and impressive as are certain of the cases in which lead alone has been used, it cannot be too emphatically stated that the importance of the research being carried out at Liverpool lies, not in the wonderful individual results obtained (which form only a small percentage of the cases treated), but in the fact that it is the first time in history that a generalized treatment has been found that brings about a local disappearance of a cancerous growth.

From a scientific point of view malignant disease differs from any other disease in that control cases are not required, the chances of the spontaneous disappearance of a malignant tumour being negligible. If, therefore, with any given treatment really malignant tumours do disappear then it may be regarded as certain that it is due to the treatment given. The necessity for further investigation into the exact action of the lead cannot therefore be too strongly advocated. In the case of radical surgical operation, or the use of the actual cautery, the principle involved is simple—namely, that of removing all the malignant cells so that none remain behind to grow; but in the case of lead and of radiotherapy the exact sequence of events leading to the disappearance of the growth is but little understood. The scientific worker is buoyed up with hope that the solution of this problem will lead to discovery of the fundamental principles which, when embodied in some form of treatment (whether akin or otherwise), will with reasonable certainty cause the disappearance of every malignant cell, and thus go far beyond the limitations of surgery.

At no other period in the history of medicine has so much attention been paid to the investigation of malignant disease as at the present time. The public expect a specific cure to be found, and the press is on the tiptoe of expectation. They do not understand that scientific discoveries are evolved little by little, and unfortunately, moreover, their anxiety that this goal should be reached

and the State Serum Institute of Denmark is to collate national standards in order to ensure conformity. The Permanent Standards Commission is also of the opinion that there is a need for further study on the standardization of antidysentery serum and tuberculin, and on the recent specific methods for the diagnosis, treatment, and immunization of scarlet fever, and views with satisfaction the world-wide use of the international standard for insulin. The Health Committee decided that the Malaria Commission should continue, and that the malaria courses at the Institutes of Tropical Medicine in London, Paris, and Hamburg should be repeated in 1927. It approved the wish of the Conference of Child Welfare Experts that information should be obtained as to the instructions given in various countries to students of medicine, nurses, midwives, and district nurses on infant welfare and hygiene. The topics of school hygiene, international nomenclature of causes of death, public health administration, and health insurance also engaged the attention of the committee. The report of the medical director of the Epidemiological Intelligence Service indicated that Albania, Chili, China, Costa Rica, Luxemburg, Peru, Anglo-Egyptian Sudan, and Transjordania had been added to the list of countries supplying information. The Epidemiological Bureau at Singapore is in working order, and receives reports regularly from 112 stations in Asia, Australasia, and East Africa. From these transactions, which will be reported to the December session of the League, it is plain that the activities of the Health Committee have ranged both far and wide. Some of its work makes an obvious appeal. An intelligence service receiving regular epidemiological reports from practically every country in the world which is capable of preparing returns must impress the minds of all. The value of its work on the standardization of curative serums and insulin will be cordially recognized by the medical profession, though fully appreciated perhaps only by experts in these particular fields. But in all its enterprises, whether simple or complex, the committee appears to be building securely, and by drawing together scientists of so many countries in the common interests of all it is helping to promote that comity between all nations which is a primary object of the League.

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.

ABOUT two months ago the National Association for the Prevention of Tuberculosis became the tenant of rooms in one of the houses which have recently come into the possession of the British Medical Association at the corner of Tavistock Square. It holds its council and committee meetings in the House of the Association, and the vice-chairman of its council is Sir Robert Philip, President-Elect of the Association. The address of the National Association is 19, Tavistock Square, W.C.1. Its annual report reviews the events of the year, including the annual conference at Glasgow last July, which was reported in our columns at the time (July 10th, p. 66). In an appendix to the report the working of the Burrow Hill Colony, in its third year, is described by Dr. A. H. Macpherson, the resident medical superintendent. The number of men in residence at the beginning of 1925 was 43, at its end 63. There were 214 admissions during the year; of these 139 were ex-service men, of whom 12 were admitted for systematic training. Convalescent patients are largely employed in occupational work in the colony's market garden and grounds; it also has a farm, with cows, horses, pigs, and poultry, and a number of men have been trained in the pig and poultry section. The cows, which are tubercle-free, yielded a supply of milk ample for the colony, which has also a carpentry and joinery department; the men there under training did work for the institution, and also made and erected portable buildings, fencing, and gates for local residents. In March, 1925, inquiries were sent to 90 men who had completed their course of training; 71 replied. Of these 25 were following the occupation for which they had been trained, 12 some other occupation, and 13 had been unable to obtain work; 8 had been on treatment allowance since leaving the colony; 8 had relapsed after beginning to work; 1 had emigrated to Australia; and 4 had died. Of the 194 patients who ceased to be residents during the year 150 improved, 36 experienced no change, 6 became worse, and 2 died. Another activity of the National Association which is perhaps not as well known to the medical profession as it deserves is the set of films it possesses; these are described in an appendix, and are of a popular character; one shows the production of certified milk, and another the life and work at the Burrow Hill Colony. A third appendix gives a list of lantern slides, statistical and bacteriological, of non-pulmonary tuberculosis, and of the cripple institutions at Alton and Hayling Island, of Rollier's sun school at Leysin, and of certain sanatoriums and open-air schools. Both the films and the slides can be hired on terms which can be obtained on application to the secretary.

HEALTH AND WELFARE OF SEAMEN.

LAST summer an international conference on the health and welfare of merchant seamen was held at Oslo under the auspices of the Norwegian Red Cross Society and the League of Red Cross Societies. We published a very full account of its proceedings, and printed the resolutions containing the recommendations at which it arrived, in our issue of July 31st, 1926 (p. 205). The official report has now been published by the League of Red Cross Societies (2, Avenue Vélasquez, Paris; price 2s. 6d.). One of the chief recommendations was that bureaus should be established in all seaports throughout the world, to furnish either treatment or information as to where medical advice and treatment could be secured, postal facilities, and particulars of local recreations and social facilities, and sleeping accommodation. It also invited the League of Red Cross Societies to co-operate with the International Labour Office, the Health Organization of the League of Nations, and other similar organizations, in appointing a standing committee on the welfare of seamen; it would investigate facilities for the medical treatment of seamen, including the standardization of ships' medicine chests, the issue of manuals, the preparation of a wireless code for medical consultations at sea; it would also take steps to forward the education of ships' officers in first aid, and generally to promote health propaganda among seamen and to improve welfare conditions on board and in port. The first part of the report contains an account of the proceedings at the conference, and the second data on legislation and other measures for the protection of seamen.

THE HASTINGS LECTURE.

SIR BERKELEY MOYNIHAN, Bt., President of the Royal College of Surgeons, will deliver the Hastings Lecture of the British Medical Association in the Great Hall of the Association's House, on Monday, January 24th, when the Minister of Health, Mr. Neville Chamberlain, will take the chair at 8 p.m. After the lecture questions and a short discussion will follow. The lecture is intended for the general public, and is thus an extension of the practice of the Association to arrange a public lecture at its Annual Meetings. Admission will be free, and tickets can be obtained from the Financial Secretary, British Medical Association House, Tavistock Square, London, W.C.1. The subject Sir Berkeley Moynihan has selected is "Cancer and how to fight it."

Public Health Council, Dublin, for distribution in Ireland. No reference is made to the treatment of rodent ulcer or to non-malignant conditions, but in the introduction it is mentioned that in the first case the suitable lines of procedure are generally known, and the technique for menorrhagia does not require further research. It is added that radium has been shown to be valuable therapeutically in myeloid and lymphoid leukaemia, though the benefit is only temporary as a rule. No radical change has been made in the radium therapy of malignant disease during the last five years, but there is now a tendency to use numerous comparatively small sources of radium for long intervals (for seven to ten days) in place of applying single intense sources for shorter times.

Clinical Investigations.

The investigations considered in the report are classified under six headings—namely, cancer of the breast; cancer of the uterus; carcinoma of the mouth, nasopharynx, labyrinth, and oesophagus; carcinoma of the rectum, bladder, and prostate; sarcoma and lymphosarcoma; and experimental investigations.

1. Cancer of the breast was treated by surgical radium therapy at the Middlesex Hospital. Of fourteen cases of recurrent carcinoma in this situation a radical operation had been performed in eleven, and in the remaining three there had been local removal before commencing radium treatment. It was found that in advanced cases without hope of cure treatment by radium would prevent ulceration of the recurrence, and so save the patient from very much pain. In earlier cases large doses often caused the tumour to disappear or retarded its growth. At St. Bartholomew's Hospital eight primary breast tumours and eight recurrent were treated, and it is stated that the results of the primary carcinoma of the ordinary type with a small growth are very encouraging. Apparent cure followed in three cases out of eight, and the remainder showed good local results. In recurrent carcinoma the results of treatment were extremely bad, and in no case was life appreciably prolonged. From Dublin reports were received upon four cases of recurrence after operation, one case in which radium was associated with operative treatment, and four inoperable cases. Judicious radium applications were found to give effective assistance to subsequent surgical work. Surface radium therapy of carcinoma of the breast was used at the Middlesex Hospital for primary breast cases, for inoperable supraclavicular recurrences, and for nodular recurrences. It is noted that in many cases the existence of a second nodule is evidence, not of a localized, but of a widespread condition, and that therefore radium treatment often fails to benefit the patient, though the actual nodules dealt with may disappear.

2. Cancer of the uterus is considered mainly from the point of view of technique rather than of statistics, and the reports from ten centres show that there was much variation in the procedure adopted and the dose. The introduction of 50 to 100 mg. of radium element into the cervical canal for twenty-two to twenty-four hours was used by all except St. Bartholomew's Hospital, where a study of the effect of much smaller quantities acting continuously for six days is in progress. For tumours which could not be reached by radium tubes in the cervical canal the procedure differed considerably. In some cases applicators were packed round the tissues involved; in others needles were inserted into the growth. Statistical data were received from University College Hospital, Birmingham General Hospital, Cardiff Royal Infirmary, St. Bartholomew's Hospital, and Dublin. By collating the data it is shown that of 178 patients with inoperable disease reported not less than one year after treatment, 120 had died, 27 were apparently free from the disease, and 31 were alive but not cured. Of 16 border-line or operable cases, death had occurred in 4, 6 patients were apparently cured, and 6 were alive but not free from the disease. Reports on cancer of the body of the uterus were received from Cardiff (11 cases), from the Medical Women's Federation (6 cases), and from Dublin (1 case).

3. Carcinoma of the mouth is the subject of reports from St. Bartholomew's Hospital, Middlesex Hospital, Birmingham, Aberdeen, and Dublin. At King's College Hospital ten cases of cancer of the oesophagus were treated with immediate benefit as far as pain and swallowing were concerned. After a few days there was usually some return of the symptoms in consequence of inflammatory reaction. The growth occasionally became less vascular and appeared firmer and denser, but actual fibrosis and arrest were not obtained. Birmingham reported good results of the combination of diathermy and radium, while in Dublin three cases were treated with combined local and surface application with temporarily good results.

4. Carcinoma of the rectum was treated by radium in four cases at St. Bartholomew's Hospital, in eight cases at King's College Hospital, two cases at Aberdeen, four in Dublin, and one at Cardiff. St. Peter's Hospital, London, reported upon the treatment of two cases of carcinoma of the bladder and one of the prostate. Cardiff and Dublin returned one case each of carcinoma of the bladder.

5. Sarcoma of bone was treated with success in two cases at the Middlesex Hospital which prior to the introduction of radium therapy would have been considered almost hopeless. Both patients are alive and apparently free from growth more than eighteen months after the first appearance of the growth. Aberdeen reported the treatment of two cases of sarcoma, St. Bartholomew's Hospital three, Cardiff five, King's College Hospital of one, and Birmingham and the London Hospital two each. Included in these reports were four cases of spindle-celled sarcomata, with good results in three and a questionable result in one case; three round-celled sarcomata, with success in one and failure in two cases; one lymphosarcoma, and one polymorphic-celled sarcoma, each with a bad result; and one osteosarcoma which ended favourably.

6. Experimental work was continued at the Radium Institute, and two investigations were published in 1925. The first, in the *British Journal of Experimental Pathology*, dealt with the artificial cultivation of tissues with reference to the production of cancer by means of radium and x rays; the second investigation, entitled "The reaction of the skin to a radium exposure repeated after varying lengths of time," was published in the *British Journal of Radiology*. In the first case it was shown that extracts of normal tissues inhibited the growth of normal cells cultivated *in vitro*, and that the exposure to radium or x rays of normal tissues, either *in vitro* or *in vivo*, destroyed the inhibiting factor, thus suggesting that cancer might be the result of the destruction of growth-inhibiting factors, rather than of the production of growth-stimulating factors. The second investigation indicated that a certain small extent of skin desensitization could be obtained by administering a small dose of radiation. Dr. J. C. Mottram communicated to the Royal Society a paper upon the effects of beta rays upon the growth and division of tumour cells. Radium salt was also supplied to Sir Ernest Rutherford at the Cavendish Laboratory, Cambridge, for purely experimental work.

CONFERENCE ON MENTAL WELFARE.

A CONFERENCE, called by the Central Association of Mental Welfare, was held at Westminster on December 2nd and 3rd. The subjects discussed were the after-effects of encephalitis lethargica, borderland cases and delinquency, the training of teachers for special schools, and the care of defectives outside institutions. The large majority of those present being lay people it was, of course, the social and administrative side of mental deficiency rather than the medical side which was discussed.

Lethargic Encephalitis.

Sir ARCHIBALD BODKIN, director of public prosecutions, who presided over the session which discussed encephalitis lethargica, referred to the interesting report on the cases in Sheffield, the result of the investigation prompted by the Sheffield Division of the British Medical Association (JOURNAL, November 27th, p. 1008), and hoped that more appropriate, perhaps more humane, treatment for this class of offender would be the result of the bill recently introduced into the House of Commons.

Dr. A. F. TREDGOLD raised the question whether the mental sequelae of encephalitis lethargica were temporary or permanent. He had seen cases in which both serious intellectual impairment and marked conduct disorder had,

makes them exaggerate the importance of any new work. The workers themselves are appalled at times to find that some purely scientific statement has been taken up and so turned and twisted as to suggest that a panacea has been evolved. By none is this more keenly felt than by Professor Blair Bell and his co-workers, who have never claimed that lead treatment is an infallible cure for malignant disease, but they have approached the matter from a scientific standpoint, a fact which is evident to all who visit Liverpool.

NERVOUS AFFECTIONS OF THE OESOPHAGUS.

SEMON LECTURE BY DR. A. BROWN KELLY.

THE Semon Lecture under the auspices of the University of London was delivered in the Robert Barnes Hall at 1, Wimpole Street, on December 2nd, by Dr. A. BROWN KELLY of Glasgow, who took for his subject "Nervous affections of the oesophagus." The chair was occupied by Dr. ANDREW WYLIE, President of the Laryngological Section of the Royal Society of Medicine.

Dr. BROWN KELLY said that he intended to deal mainly with spasm of the upper and of the lower end of the oesophagus, and only very briefly with paralysis. He first gave a close description of the structure and function of the oesophagus, and remarked how little was known—and that mainly of a negative character—about the influence of the sympathetic system on the gullet. With regard to spasm of the upper end of the oesophagus, he uttered a warning against the passage of bougies blindly before endoscopic examination had been made. In some cases, when spasm had been present for years, malignant disease supervened, and if in such cases a bougie was inserted with the force necessary to overcome the spasm fatal damage might be caused. The patient should be placed under a general anaesthetic, and a thorough examination made. The treatment of this affection consisted in stretching the muscle; the immediate benefit of stretching was that the patient was able comfortably to swallow food which for years he or she had been unable to take. It was important to convince the patient of his new power of deglutition, and he should be required before leaving hospital to eat a variety of foods hitherto impossible. The lecturer thought that the relation of pharyngo-oesophageal spasm to anaemia would be a fruitful subject for investigation. This association, though recognized by endoscopists, had not been placed on a scientific basis.

Turning next to spasm of the lower end of the thorax, which occupied the main portion of his lecture, Dr. Brown Kelly pointed out that it was in the hiatal region that cardiac spasm was seen. Spasm at the lower end of the oesophagus differed essentially from that at the entrance of the canal owing to dissimilar conditions in the two situations. The muscle, which at the upper end was striated and strong, was at the lower end unstriated and yielding. The upper end was closed except during deglutition, while the lower end expanded and contracted with the movement of the chest. The onset of the disease was insidious and excited little attention, so that the patient, when first seen by the doctor, might have a history of an affection extending back for months or years. His complaint was of occasional difficulty in swallowing and pain in the lower chest. As the symptoms caused only temporary discomfort they might be borne for a long period before advice was sought, but gradually they became more pronounced and the patient became unable to take a meal without obstruction and regurgitation. In the absence of appropriate treatment, death from starvation might terminate one of the periods of enforced fasting. The lecturer exhibited a chart showing in the case of one patient that in the course of four meals in one day he had swallowed 116 oz. of food, of which he had regurgitated 69 oz. and retained only 47.

He next described the method of making the *x*-ray examination in such cases, and mentioned the interesting investigation by the cinematograph of the part played by the oesophagus during deglutition as revealed by *x* rays. The appearance of the dilated oesophagus in cardiospasm was usually fairly uniformly sausage-shaped. Mottling or fuzziness was often seen in the upper part owing to the presence of air, and an irregularity at the deepest part might be due to retained food. Sometimes the oesophagus was spindle-shaped. Dilatation of the oesophagus was met with in other obstructive diseases, but in none did it attain such great dimensions as in cardiospasm. In cancer, cicatricial stricture, and compression stenosis the dilatation was not comparable with that met with in this condition.

For endoscopic examination the patient should be placed under a general anaesthetic which permitted a thorough inspection of the oesophagus. In introducing the oesophagoscope rather more resistance was met with than in the normal subject. When the oesophagus was entered a large quantity of cloudy fluid rushed along the tube and could be drained off. At the lower end soft masses of food were usually collected. Besides dilatation the oesophagus would be found to have undergone elongation. The average length of the oesophagus from the upper teeth was 40 and 39 cm. in men and women respectively, but in a series of cases of spasm it was found elongated by an average of about 3 cm., without taking into account the fact that the average stature of the group of patients taken was rather below the normal. Heightened reflex activity at the hiatus was looked for in 18 patients with cardiospasm, and found in 17 of them, whereas in patients with affections of the oesophagus other than cardiospasm it was absent in all. This was, therefore, an important sign of cardiospasm. The patient himself could do much to assist in controlling this disturbance, especially by his choice of food, and by the care he exercised in swallowing it. All food must be thoroughly masticated and swallowed with an effort. Several efforts at deglutition might be necessary before it was accomplished, and the presence of a stranger at table, especially if he appeared to the patient to be watching him, might frustrate the act. Similarly, a faulty position of the body might hinder the accomplishment. Some patients felt compelled to eat their meals standing up. Sedatives were not called for in treatment. The passage of bougies assisted deglutition at once, but the improvement as a rule quickly passed off. The surgeon should aim at stretching the cardia to a greater degree than could be attained by the largest bougies, and he gave an illustrated description of an apparatus whereby a rubber pack which could be distended with water was used for this purpose.

The lecturer concluded with some account of a toxic variety of spasm as observed by him in two victims of "botulism" whom he had the opportunity of examining during the food poisoning outbreak in Scotland in 1922, when, as a result of eating some sandwiches, eight persons died of this condition. There was palsy of the ocular muscles and gradual involvement of the throat, larynx, and tongue. The toxic effects were apparently limited to the motor neurons, for intelligence was preserved until the end. He understood that this outbreak was the first of its kind in this country, and that there had been none since.

RADIUM THERAPY.

REPORTS FROM RESEARCH CENTRES.

THE Medical Research Council is entrusted by the Government with a stock of radium salt for distribution to suitable institutions, and a summary of reports from these centres is published annually; that for 1925[1] has just been received. In the JOURNAL of December 20th, 1924 (p. 1170), we dealt with the report for 1923, and in our issue of April 24th, 1926 (p. 747) we referred at length to the report for 1924. The present report contains a summary of results from nine clinical centres: the Middlesex Hospital, University College Hospital, St. Bartholomew's Hospital, King's College Hospital, the London Hospital, St. Peter's Hospital, Birmingham General Hospital, Cardiff Royal Infirmary, and Aberdeen Royal Infirmary. In addition to these the London Association of the Medical Women's Federation receives radium for use in a group of hospitals; reference to its work appears at page 1132 of this issue. Radium salt is also allocated to the Irish

[1] Medical Research Council, Special Report Series, No. 112. Medical Uses of Radium: Summary of Reports from Research Centres for 1925. London: H.M. Stationery Office. 1926. Price 1s. 3d. net.

£80,000. But this sum represented less per head of patients treated than in previous years. Three explanations for this reduction were given by Lord Hambleden. First, a deficit in the working of the association in 1925 had to be paid off; secondly, there had been an excessive increase in the demand for hospital treatment during part of the year under review; thirdly, heavy expenses had been incurred for extra hospital benefits. It had been found necessary to curtail these extra hospital benefits to a maximum of 15 per cent. of the contributors, and to suspend altogether dental benefit for dependants. From Lord Hambleden's speech it was evident that one of the problems encountered by the association was the tendency of people to join when there was a prospect of themselves or their dependants requiring hospital treatment. The Hospital Saving Association possesses an organ called the *Contributor*, with a circulation of 60,000 copies. Lord Dawson, in his address to the meeting, described the progress in knowledge which was obtained through hospitals. Mr. McAdam Eccles was re-appointed a member of the executive council. From the size of the organization it is evident that the ideas of the late Dr. Gordon Dill have taken root and are fructifying.

Jubilee of University College, Bristol.

In celebration of the fiftieth anniversary of the foundation of the University College, Bristol, a reception was held on December 3rd at the University, and afterwards a meeting in the Great Hall, when the chair was taken by the Vice-Chancellor, who said that the men and women of fifty years ago sowed the seed of which to-day the harvest was being reaped. There was no better reply to those who were apt to scoff at the Victorian age than to ask them to contemplate the magnificent optimism of the men and women who in the great cities of the country laboured to found university colleges out of which so many flourishing universities had grown, or to read the list of distinguished men who with real missionary zeal taught in these university colleges. Balliol College and New College, Oxford, took a very generous part in financing University College, and both were represented.

The Function of a University.

The Master of Balliol (Dr. A. D. Lindsay) recalled what Professor Jowett had said about University College, Bristol. The chief point he stressed in his speech was the need he felt for the universities to extend their borders, adding that it was intolerable that university education should be confined to a small minority. Another point in the speech was the need for combining a liberal education with a scientific education, and he welcomed the fact that the medical school at Bristol was among the foremost in insisting that the arts side should be taken in with the scientific side. The other point he stressed was that college was a place where men lived together and learnt together, and that if they forgot that they forgot a great deal of what went to make up a university. It was extremely important that our universities should be the centre of our national life, and he was proud of the part University College had played in founding this centre of inspiration for Bristol. Professor Lloyd Morgan said old students had told him how much they owed to men like Professors Silvanus Thompson, Rowley, and Fanshawe. The difficulty in the early days was to keep the arts side alive. This, however, was done under distinguished men like these. Mr. F. Richardson Cross, Dr. T. D. Sibley (principal officer of the University of London), and Dr. H. S. Hele Shaw also spoke.

Pre-immunization against Tuberculosis.

In November a report was presented to the Port Sanitary and Hospitals Committee of the city of Liverpool by Dr. J. G. Moyles, who is chairman of the committee, and Dr. C. Rundle, medical superintendent of the Fazakerley Hospitals, describing a visit they had paid to Dr. Calmette at the Institut Pasteur in Paris. The report describes the theories upon which Dr. Calmette bases his use of B.C.G. for the pre-immunization of infants against tuberculosis. The views and methods of Dr. Calmette were stated in detail in the BRITISH MEDICAL JOURNAL, March 27th, 1926, p. 581. Drs. Moyles and Rundle found that the results claimed for the inoculation in infants were very striking; but at the same time the disparity between the figures for alleged infantile mortality from tuberculosis in many Continental cities and the mortality from the same cause in Liverpool was such that the observers could only suppose that there must be a divergence in standards of diagnosis. Drs. Moyles and Rundle obtained, by the courtesy of Professor Calmette, a small quantity of B.C.G. This is now being examined by Professor J. M. Beattie, the city pathologist, and a similar investigation is said to have been undertaken by the Ministry of Health. As is usual when reports such as that of Drs. Moyles and Rundle are made, the lay press produced articles headed "Stamping out of consumption." Whether the public benefit or not by these premature announcements need not be a matter of much concern to the investigator. But it is important that the claim of a scientist such as Professor Calmette should be properly examined, whatever the effect may be on present notions about tuberculosis and its treatment.

Bristol Medical Dinner.

The annual dinner of the Bristol Medical School was held on December 2nd on the premises of the University Union at the Victoria Rooms. About 150 past and present students and members of the staff attended. Professor Fawcett, F.R.S., dean of the Faculty of Medicine and professor of anatomy, presided, and Dr. J. T. Wilson, F.R.S., professor of anatomy in the University of Cambridge, was the guest of the evening. In proposing the toast of "The Bristol Medical School," he congratulated it on its close association with the University. In the profession of medicine it was not mere craftsmen, but men of broad outlook and culture, who were wanted, and it was this which distinguished a graduate of a university from a student of a technical college. He referred to his thirty years' experience at the head of the medical school in Sydney, where he had watched the numbers of students increased gradually from a mere dozen until they exceeded a thousand. Dr. R. S. Statham and Mr. J. Newton replied for the medical school. Mr. A. J. M. Wright proposed the health of the President. After the dinner a most successful reception and dance was given in the same building by the wives of the staff.

Street Accidents in London.

The London County Council is calling for a full inquiry as to the measures which can be taken to lessen the great loss of life and limb due to street accidents in London, and is asking the London and Home Counties Traffic Advisory Committee, which is the authority for advising on measures for facilitating and improving the regulation of traffic, to summon a conference of all concerned. The number of deaths in street accidents in the metropolitan police area during the first nine months of 1926 was 710, as compared with 840 for the whole year 1925. The number of persons killed yearly has increased nearly fivefold in twenty-five years, and the number of injured (40,173 last year in Greater London) has increased in much the same proportion. Nearly three-fourths of those killed are pedestrians, and between one-third and one-fourth of them are children. With regard to comparisons with other cities, the London streets seem to be more deadly than those of Paris, but less so than those of New York, where, with a population equal to three-fourths of that of Greater London, the number of deaths due to automobiles is nearly double. It is admitted that the attitude of a number of the victims adds to the difficulties of the problem. Subways are provided, but people will not take the few steps necessary to make use of them, and prefer to take risks in getting among the traffic. It is considered that regulations should be made on the assumption that pedestrians will frequently not exercise the necessary care, and that the use of streets by vehicles must be governed accordingly. The need for retention of speed limits in urban areas should be thoroughly investigated. The provision of more street refuges appears to be essential. Experiments with definite street crossings, with and without police, should have useful results, and above all a closer and more effective control by the police is called for to diminish, not only cases of dangerous and negligent driving, but the inconsiderate use of the streets by drivers of motor vehicles.

in the course of time, undergone very great improvement; on the other hand, there were cases which, even after a lapse of three or four years, showed no appreciable change. One of the obstacles to treatment was a narrow interpretation of the clause in the Mental Deficiency Act whereby, to permit of certification for institutions under that Act, the defect must have been present from birth or from an early age. He himself thought an "early age" might include up to 16, but others took a much narrower view. At present there was no adequate provision for these children, in spite of the fact that they were numerous and constituted a severe social menace. The best solution would be the foundation of special establishments under medical supervision.

Dr. F. C. SHRUBSALL said that the Metropolitan Asylums Board had opened one such institution, but the period had been too short to permit of any definite deductions; the experiment had shown, however, that two types of cases presented special difficulty—namely, mentally deranged and violent cases, and those showing symptoms of Parkinsonism. The latter might ultimately require to be dealt with at some home for incurables, and the former placed under prolonged and possibly permanent care in a mental hospital or certified institution.

Dr. E. MAPOTHER said that a great deal still remained to be done in the investigation of Parkinsonism and of the analogous mental "stiffness." The difficulty of the situation arose from the obscurity of onset of encephalitis. He was inclined to make the time interval between the onset of the disease and the mental after-effects even longer than the two years which Dr. Tredgold had suggested. The provision of special institutions would not solve the question. He favoured the appropriate use of existing arrangements. It would be impossible to provide in numerous localities all the specialized kinds of institution which cases of encephalitis lethargica might need, and any institution for all the sequelae would be of the most heterogeneous description. What was needed for these cases was what was required for mental cases generally—namely, some institutions for early treatment without certification. He commented on the refusal of magistrates to grant detention orders in cases of conduct impairment, though they were ready enough to do this in cases which exhibited hallucination and delusion, which the post-encephalitic did not show. He thought every first offender should be seen by a doctor.

Borderland Cases.

In the discussion on borderland cases Dr. W. R. K. WATSON, senior medical officer to Brixton Prison, estimated the number of subnormals at 3 per cent. of the general population and 5 per cent. of the prison population. Many subnormals, of course, were not delinquent at all, but were of the most harmless and amiable character. The subnormals in prison were unfit for ordinary prison discipline, and were not exposed to it. They were regarded as medical cases and located in hospital or in a reserved part of the gaol, and their treatment approached as closely as conditions permitted to that given in a mental hospital. He advocated a certain specialization in function in prisons, with the setting apart of one or more prisons for borderland delinquents, with medical staffs selected for their knowledge of and interest in mental work. Dr. E. GOODALL (Cardiff Mental Hospital) gave some account of the out-patient clinic which was started at the Cardiff Royal Infirmary six years ago for dealing with patients who, though certifiable, need not and should not be certified. Its work had been not without result as an object lesson, for the Poor Law authorities, in drawing up plans for an important hospital near the city, had made provision for the indoor treatment of early psychoses and psycho-neuroses in the shape of a separate building on the estate. He was opposed to outdoor clinics in psychiatry unless indoor clinics were associated with them.

Teachers for Special Schools.

At the session which dealt with the training of teachers for special schools, over which Dr. H. B. BRACKENBURY presided, Lord EUSTACE PERCY, President of the Board of Education, described this as the most difficult problem to be faced in education, in view of the wide and varied range of mental defect.

England and Wales.

LONDON SCHOOL OF MEDICINE FOR WOMEN.

THE annual dinner of the London (Royal Free Hospital) School of Medicine for Women was held at the Savoy Hotel on December 2nd, when Lady Barrett, dean of the school, presided over a company of nearly four hundred. Sir John Rose Bradford, P.R.C.P., proposed the toast of the evening, and spoke of the school as having a very creditable past and a very ambitious future. He remarked that medical schools, if they were to fulfil their high functions, must be not only centres of training but of research. With regard to the hospital, he rejoiced that the voluntary principle appeared now to be more firmly established in this country than it had been for many years past. Voluntaryism in hospitals signified more than the obtaining of voluntary funds from the public; it stood for disinterested and voluntary service of various kinds, and in this respect the Royal Free Hospital had been exceptionally fortunate. Lady Barrett, in responding, referred to the fact that at the previous dinner those present had received from their late beloved dean (Dame Aldrich Blake) what proved to be her last message. After referring to the approaching completion of the new children's ward, to be opened by the Queen early next year, and to the approaching centenary of the hospital, she said that a few years ago large numbers of students who had qualified were applying for and obtaining posts in the public health services, but later there came what she described as a most extraordinary and un-British regulation forbidding the occupancy of such posts by married women. Every normal young woman wished to marry, and the regulation was regarded as a restriction on liberty; but it had had the effect of bringing about a great change in the kind of work undertaken by those graduating. They were now, to a much larger extent than formerly, entering general practice, and there was no sphere of work in which women were more likely to come into their own, for in general practice one of the first duties was preventive medicine. Women in general practice would assist in clinical research into the origins of disease. Moreover, with the increase of cottage hospitals and public laboratories, the life of the general practitioner was likely to be more full of interest than hitherto. The toast of "The Guests" was proposed by Mr. Ulysses Williams in a very amusing speech, and responded to by Dr. Franklin Sibly, who said that the University of London would shortly have to take in hand the very serious task of co-ordinating the work of the colleges and schools from the point of view of organizing a much larger measure of post-graduate medical study. He was sure that in that enterprise the Royal Free Hospital and School of Medicine would play its due part. The health of the Chairman was proposed by Dr. Mary Blair.

THE HOSPITAL SAVING ASSOCIATION.

The Hospital Saving Association seems to be establishing itself in a strong position. The object of the association is to enable persons of small means to make provision for hospital treatment for themselves or their dependants, if it should become necessary. The provision is made by means of small weekly contributions collected from groups of contributors in many different occupations; and from the fund so gathered distribution is made to hospitals, whether co-operating in the scheme, non-co-operating, or rate-aided, in accordance with the number of contributors treated and the duration of their stay in hospital. About a thousand representatives, chiefly group secretaries, met in the Kingsway Hall, London, on December 1st, to receive from Viscount Hambleden the annual report of the association, and to listen to an address by Lord Dawson of Penn. Lord Hambleden stated that the number of contributors to the scheme was 267,000, representing with their dependants about three-quarters of a million persons for whom hospital treatment could be provided. With the final distribution to co-operating hospitals recommended by the executive council, the total payments for the year made to hospitals and other institutions amounted to over

provided. The scheme is to a great extent on the lines of the chief recommendation made by the Departmental Committee of the Scottish Board of Health for the establishment of subsidiary hospitals connected with general hospitals to relieve the congestion in the latter.

Ireland.

MEDICAL RESEARCH IN IRELAND.

A DISCUSSION on medical research was held on November 19th by the Section of Pathology of the Royal Academy of Medicine in Ireland. Dr. J. W. BIGGER, professor of pathology and preventive medicine in Dublin University, who was in the chair, gave an opening address, in which he limited himself to laboratory research, describing its motives, prospects, methods, and embarrassments. The difficulties of the research worker were partly inherent in his work and partly forced on him by the necessity of engaging in teaching, routine diagnostic work, or public health; it ought not to be necessary to hold over research work until such daily duties had been finished. The present position in many university laboratories of pathology and bacteriology was a serious bar to progress in research. He pleaded for the adequate payment of research workers and for the encouragement of medical research in Ireland, where hitherto it had been much neglected. Dr. T. G. Moorhead dealt with clinical research, of which, he said, there was as much need to-day as there had ever been. The tendency to replace the teaching of therapeutics by education in scientific pharmacology was, he thought, a mistake, since the action of drugs on healthy animals might differ from their effect on sick patients. To ensure collaboration between clinicians and laboratory workers due credit should be given to the clinical aspect of the case; too often this was regarded as unimportant by the laboratory worker. Dr. Moorhead deplored the meagre salaries of university teachers generally, and hoped that the new spirit of progress in the Irish Free State would result in a considerable increase in the endowment of medical research. Mr. W. Doolin referred to the fame of Dublin as a centre of medical investigation in the time of Abraham Colles, Cusack, and Henry Marsh. In the present state of poverty of the country Ireland was unable to keep up with wealthy countries, such as America, in the race of scientific progress, and it was impossible to carry on research at present on a grand scale. Clinical research needed greater consideration than it was receiving, and every correctly performed surgical operation was a physiological observation, the operating theatre being the laboratory of the surgical worker. A whole-time teaching and research surgical unit should be established for the study of such problems as the true significance of Graves's disease, the prevention of intraperitoneal adhesions, and the physiology of bone. The present inadequate training of students in research was lamented by Dr. T. T. O'Farrell, who considered it the cause of lack of interest after graduation, which accounted for the paucity of investigators. Professor J. M. O'Connor agreed that all research work should be associated with teaching so far as possible. Elaborate equipment was relatively unimportant, and much valuable research could be done with inexpensive apparatus. Dr. W. MacFetridge thought it was impossible to expect funds from the Government; the only chance of obtaining money lay in private generosity. He believed that by providing in Ireland a body corresponding to the Medical Research Council some support would be obtained. Whole-time research workers were needed in Dublin and should be adequately paid. Dr. J. Speares said that in England the Medical Research Council had first been financed by money derived from the National Health Insurance scheme, and thought that something similar might be done in the Free State. More young men should be admitted to hospital staffs; in some cases small salaries were already being paid to enable them to carry on work in hospitals after graduation. In Dublin men were needed to direct research as much as to perform the actual investigations.

Correspondence.

LEPROSY: ITS TRANSMISSION AND TREATMENT.

SIR,—Of recent years a number of statements have appeared, both in the medical and the lay press, on the curability of leprosy by various forms of treatment. Certain of these statements have been made by men with long and close experience of the disease, who have had ample opportunity of testing the value of the particular treatment they advocate, in a large number of cases and over a long period of years. Equally forcible statements have been made by others, based on isolated cases, without having them under observation for a sufficient time to know if any improvement which may have occurred was permanent.

In the present state of our knowledge statements with regard to the cure of leprosy, in the ordinary sense of the term, as understood by the lay mind, are to be deprecated, as they are not only misleading to the public, but are apt to cause bitter disappointment to the patients themselves.

Everyone with considerable experience of the treatment of leprosy has had cases in which the disease has undergone periods of more or less complete remission while under some form of treatment. These remissions have been too often temporary, and, after a longer or shorter interval, especially in early cases, a recrudescence has almost invariably occurred. It is necessary, therefore, before making definite statements with regard to cure, that the treatment employed should be thoroughly tested, and that the cases in which it is being used should be observed over a period of years.

Another instance of a claimed cure appeared in the last issue of the BRITISH MEDICAL JOURNAL, in a paper by Dr. E. Graham Little, under the heading of "Acute nodular leprosy originating in this country and cured by vaccine treatment." As this case has only been under the writer's observation for about six months, it seems to us that it is premature to regard it as cured, however much the appearance of the patient has improved during the treatment.

There is another point in the title of the paper which is misleading and somewhat alarming—namely, the description of the case as having originated in this country. The case was that of a Chinese student, who was shown at the Royal Society of Medicine in May, 1926, and who had only arrived in this country in November, 1925. He was seen by one of us on May 28th, when, in addition to the nodular outbreak, he showed ample signs of having had nerve leprosy for an indefinite period, certainly longer than six months. Both his ulnar nerves were thickened, there was anaesthesia in the area of distribution of the ulnar nerve on the left hand, and commencing "main en griffe."

Three contact cases of leprosy, to our knowledge, have originated in this country of late years in patients who have never been out of the country, and who have been infected by long and close contact with relatives who brought the disease from abroad. These were reported by one of us in the BRITISH MEDICAL JOURNAL (1925, vol. i, p. 107). The case referred to above does not belong to that category.—We are, etc.,

GEORGE C. LOW.
J. M. H. MACLEOD.
PHILIP MANSON-BAHR.
JAMES H. SEQUEIRA.

December 3rd.

ADVISORY COMMITTEE ON SPIRITUAL HEALING.

SIR,—We, the undersigned medical members of the Archbishop of Canterbury's Advisory Committee on Spiritual Healing, should be grateful to any medical practitioner who could supply us with information regarding patients who have received benefit from spiritual healing, whether through an organized mission of healing or individually. We appreciate that names could not be given without the permission of the patients concerned, and although we should like to have them where consent is given, we should, nevertheless, be glad to receive any information that can properly be supplied, as the desire of the committee is to

REGISTRATION OF NURSING HOMES.

The report of the Select Committee on the inspection and supervision of nursing homes has been approved generally by the London County Council, but it takes exception to the recommendation that appeals against refusal or cancellation of registration may be made to a referee appointed by the Ministry of Health. It believes that the procedure laid down in regard to lying-in homes in London is preferable—namely, that such appeals should be made to a magistrate's court. Another recommendation, that the supervising authorities may delegate their powers to a committee upon which both doctors and nurses shall have some representation, is also regarded as open to objection, and it is considered that the County Council should have complete freedom of action either to delegate this power to one of its existing committees or to a specially constituted committee which may include a specified proportion of persons of experience appointed by the Council.

EWELL COLONY.

Ewell Colony, after its evacuation by the Ministry of Pensions, is to be used by the London County Council during the next two years for the accommodation of 100 men and 329 women patients certified under the Lunacy Acts. Dr. Leonard Henry Wootton, *M.C.*, deputy medical superintendent of Colney Hatch, who has been acting at Ewell while it has served as a hospital for pension cases, has been appointed medical superintendent as from February 1st next at a salary (based on pre-war rates, and subject at the moment to an addition of £195) of £800 a year, together with an unfurnished house.

Scotland.

SCOTTISH ASYLUM REPORTS.

THE 106th annual report of the Dundee Royal Lunatic Asylum shows that during the year ending June 21st, 1926, 83 patients had been treated. Among these there had been 7 deaths, all due to natural causes; 2 were of epileptics who had suffered from that disease for many years; 6 of the 15 persons admitted were voluntary patients, which shows that increasing advantage is being taken of early admission before the derangement has become so marked that compulsory certification is necessary. The directors' report shows that the sum received for the board of patients in Gowrie House was £5,148, and that during the year seven patients had been admitted at reduced rates of board, varying from £50 upwards.

The report of the Royal Asylum of Montrose for the year ending May 15th, 1926, shows that the number of patients on the register at the end of the year was 726, and that the total number of cases treated during the year was 854. The average age on admission was 45.1 years, while one patient was under 15, seven under 20, and thirteen over 70 years of age. In 39 of the admissions there had been a previous attack of mental disorder. As a general rule the health of those admitted was much below par, and 36 were very weak. The general experience had been that as physical health improved under treatment there was usually a corresponding mental change. The effect of the present depression in trade had been shown by an increase of cases due apparently to unemployment; they numbered 13, as compared with 6 in the preceding year. The increase in attacks apparently due to alcohol—18 as compared with 7 in the preceding year—might, it was thought, partly result from the same cause. Attention is drawn to the fact that too little recognition is given by the public to the tendency in cases of mental depression to develop suicidal tendencies. Out of 39 cases of melancholia, 24 were acutely suicidal on admission, and 12 had made attempts on their lives before being certified. At the beginning of the year there were 28 voluntary boarders, and 16, or 32 per cent., of the total private admissions came under treatment in this way.

The sixty-second annual report of the Inverness District Asylum, covering the year to May 15th, 1926, shows that there were then on the register 717 persons, and that 867 patients had been under treatment during the course of the year. The admissions during the year numbered 162, and were 39 more than in the preceding year. They included 72 cases of melancholia, 47 cases of mania, 33 cases of dementia, of which 12 were secondary to other mental disorder, and 19 associated with senile decay; there were also 7 cases of congenital mental deficiency. Hereditary or family predisposition was found to exist in 69 of the 162 cases, and in 58 of the cases there had been at least one previous attack of mental disorder. Senility was the assigned cause in 39 cases. The marked increase of admissions during the present year is explained as being related to the admission of private patients to public mental hospitals and the reception in these hospitals of voluntary patients assisted by the rates.

ROYAL INFIRMARY OF EDINBURGH.

At a meeting of the board of managers of Edinburgh Royal Infirmary, held on November 22nd, it was reported that the managers had received the property of Beechmount, Murrayfield, valued at £15,000, bequeathed by the late Lady Mary Anne Anderson; it is to be converted into a convalescent home; the same donor had also left a sum of £5,073 to the institution. It was reported also that the number of cases awaiting admission to the infirmary at November 1st, 1926, was 1,856. Attention was drawn to the fact that the waiting list had for a long time stood at over 2,000, and it was explained that the fall in numbers was the result of the opening of new wards in the ear, nose, and throat department. The number of cases now awaiting admission to that department was 97, as compared with 237 in the previous month.

CHILD WELFARE IN GLASGOW.

A pamphlet explaining a scheme for maternity and child welfare in Glasgow has been prepared by Dr. A. S. M. Macgregor, M.O.H. for the city, on the instruction of the health committee. The basis of the child welfare scheme is to be the consultation centre, working in combination with a system of regular home visitation of trained and voluntary visitors. The child welfare staff in Glasgow includes eight medical officers (women) and thirty-nine nurses. The expenditure involved in connexion with the maternity and child welfare work carried out during the year to May 31st, 1926, was £122,215, of which approximately £50,000 was received from Government grants. The charge of £72,000 against the rates was equal to 1.663d. in the £. For the current year the net charge is estimated at £63,450, equal to a rate of 1.417d. in the £.

BENEFACTIONS TO GLASGOW MEDICAL CHARITIES.

The late Mr. Robert Allison of Paisley, who died recently, has left a large number of legacies to various medical charities and other benevolent institutions in the West of Scotland. The total sum is £25,500; the residue of his estate, which is expected to be considerable, is to be divided between Paisley Infirmary, Glasgow Royal Infirmary, Glasgow Western Infirmary, and Glasgow Victoria Infirmary. Among the other medical charities that will benefit to the extent of £1,000 each are the Paisley Eye Infirmary, Glasgow Eye Infirmary, the Glasgow Samaritan Hospital for Women, Glasgow Cancer Hospital, and Glasgow Royal Hospital for Sick Children; the Glasgow Hospital and Dispensary for Diseases of the Ear, and Glasgow Hospital for Skin Diseases, will each receive £500.

EDINBURGH CONVALESCENT HOME.

The Astley-Ainslie Institution for convalescent patients from the Royal Infirmary of Edinburgh is now proceeding with the second portion of its scheme. The first portion was sanctioned about a year ago and two pavilions for male and female patients, each accommodating about forty persons, are now nearing completion. The second portion of the scheme provides for the erection of three new blocks, including a nurses' home, sitting-rooms, lecture room, and other administrative buildings. The whole is planned for 150 convalescent patients, and is designed to act as an auxiliary hospital between a convalescent home and a hospital in which treatment is

The second statement to which I desire to draw attention is, "In the presence of acute symptoms it is dangerous to stimulate the peripheral ends of nerves connected with haemorrhagic and inflamed centres." This statement by itself is unexceptionable; in its context, however, it obviously means that all "electricity" must necessarily be stimulating and cannot be sedative, and therefore is dangerous. If this reading of his meaning is accurate, then Sir Robert's data are incorrect, as all "electricity" is not, *ipso facto*, stimulating, as electro-therapeutical currents exist which are entirely sedative.

If the injured cord lay more superficially and Sir Robert Jones could, with a minimum amount of movement, foment it where the "haemorrhagic and inflamed centres" exist, would he not unhesitatingly do so? I feel convinced he would. Has he ever propounded this problem to a competent electro-therapeutist and made trial of the resulting suggestion? If he has not and will do so, I can assure him, from personal experience, that he will be pleasurably surprised with the results.—I am, etc.,

London, W.1., Nov. 30th. C. B. HEALD.

SIR,—The necessity for and the great value of rest in the treatment of acute poliomyelitis was stressed by you, in your leading article of November 20th (p. 947), and also by Sir Robert Jones in your correspondence columns of November 27th.

While recognizing the essential importance of rest as a curative factor in the treatment of the paralyses left by this disease, it seems to me that there does come a time when this Fabian policy—as Sir Robert Jones calls it—should give place to, or rather should be combined with, a more active form of treatment. Rest as the only form of treatment must, if logically pursued, finally result in immobilization.

Sooner or later every practitioner in charge of a case of poliomyelitis has to face the question of the possibility of his patient's return to an active life. Whether rest has been followed out for twelve months or for two years—and personally I favour at least twelve months' recumbency in lower limb paralysis—it must ultimately come to an end.

The final judgement of parents on our management of a case of poliomyelitis is based on the subsequent proportional ability of the individual to lead a normal life and to earn a living. Put shortly it is this—can our patient ultimately walk (if a lower limb paralysis), and can he use his hands and arms to obtain a livelihood (if an upper limb paralysis)?

A long view of this character must be taken from the beginning of treatment if full ultimate success is going to be obtained. When careful attention has been paid to the details of rest, as so frequently and so ably laid down by Sir Robert Jones, this particular part of the treatment is comparatively easy.

The real difficulties of treatment are experienced when the attempt is made to regain movement. Much has been written and many investigations made regarding the prevalence, infectivity, etc., of this disease. The statistical region, as it might be called, has been very fully explored; but from the practitioner's point of view the much more important questions concerning recovery of movement and of function have been only lightly touched upon.

It cannot be a heresy to agree that rest and the prevention of deformities are vital parts of treatment, but at the same time to argue that these alone are insufficient to obtain the greatest possible amount of recovery of voluntary movement. It will possibly be stated that if muscles do not recover with rest and relaxation of opponents they will never recover at all. Also, if they do not recover, splints such as walking callipers, etc., will be necessary for the remainder of the patient's life.

This method of treatment has never completely satisfied me. I hate to see an individual permanently encumbered with a splint. When one is convinced that the acute inflammatory process has quite subsided—in many cases three months after the onset—a beginning should be made with the attempt to obtain re-education of the "apparently paralysed" muscles. Every effort should be made to obtain as much recovery as possible while the patient is recumbent—that is to say, during the first twelve to twenty-four months. Recovery after this period, when the patient is up and about, is much more difficult.

These "apparently paralysed" muscles, although very responsive to proper methods of treatment, are exceedingly delicate structures, and if subjected to fatigue they rapidly waste and lose strength. This fatigue has to be carefully guarded against, and considerable skill is required to re-educate muscles satisfactorily. While fully aware of the danger of fatigue, the practitioner should always attempt muscle re-education (the principle of the minimal load), as without it the child has a definitely reduced chance of making a useful recovery.

I do not believe in the use of electricity in this disease, and I consider that the role of massage is very limited.—I am, etc.,

London, W.1, Nov. 30th. CHARLES MACKAY.

SIR,—My experience as an orthopaedic surgeon brings me into daily contact with these cases. From the onset of the epidemic at Grays, and elsewhere in Essex, I have had the privilege of seeing, advising, and treating nearly all the patients, in consultation with Dr. Boul and other medical men.

As cases are still occurring, and now throughout England, I feel we cannot emphasize too strongly the following points: the deadliness of the disease, the importance of segregation and prophylaxis, the absolute necessity of prolonged treatment, and the very great risk of spreading the disease by the closing of boarding schools.—I am, etc.,

B. WHITCHURCH HOWELL, F.R.C.S.

London, W.1, Dec. 6th.

SURGERY IN GENERAL PRACTICE.

SIR,—I entirely agree with Sir James Berry. I am a Fellow of the College of Surgeons in general practice. For more than ten years I have given up all but minor surgery as a mute protest against what I see. When such operations as gastro-enterostomy and excision of the upper jaw are undertaken by general practitioners who do not perform a dozen major operations in a year, it is time that someone spoke out.—I am, etc.,

November 30th. F.R.C.S.

SIR,—Sir James Berry does not appear to realize that many general practitioners who do major surgery and who are members of the staff of the hospital in the town in which they practise make considerable efforts to qualify themselves for the surgical work which they are called upon to perform.

Commencing their training whilst holding one or more house appointments at a big hospital, they supplement their knowledge and experience by taking out courses in operative surgery and by periodical visits to the operating theatres in London or other large centres, where they see the latest improvements in methods and technique.

The Fellowship of Medicine, in the development of which Sir Arbuthnot Lane has taken great interest, has, in recent years, enabled many men to pay these periodical visits under the most advantageous conditions.

As Dr. Gordon Taylor says, we general practitioner surgeons have to live among the people upon whom we operate, and if the results obtained were not sufficiently good, our colleagues would soon cease to ask us to operate on their patients, and our own patients would no longer ask us to operate upon them or on other members of their families.—I am, etc.,

December 4th. M.D., F.R.C.S. (In general practice.)

SIR,—This appears to me to be another onslaught on the general practitioner, who has but recently survived the charges of being an incompetent obstetrician.

The general practitioner will not undertake that surgery which he knows he cannot accomplish. Moreover, the claims (to do surgery) of many men engaged in general practice are sometimes greater than those of some "half-baked specialists." Some of us have but recently taken to general practice and have probably done more surgery

collect evidence as to the value of spiritual healing, and the type of person most likely to be helped by it.

Letters may be addressed to any of the signatories. —We are, etc.,

WILLIAM BROWN.
H. CHARLES CAMERON.
J. WALTER CARR.
W. MCADAM ECCLES.
PERCIVAL H. S. HARTLEY.
MAURICE CRAIG,
Honorary Secretary.

London, N.W.1, Dec. 6th.

THE PUBLIC, THE DOCTOR, AND THE MASSEUSE.

SIR,—Those branches of treatment that are described collectively as "physical" are rapidly increasing in scope and importance, and consequently a situation has arisen that needs very careful review.

The number of qualified medical men who have studied these methods seriously is very small. The number of patients who seek it is very large. Consequently the vast majority of these must place themselves in the hands of masseuses who lack the competent supervision that they need.

To avoid unnecessary detail I will dismiss the subjects of massage, and that part of medical electricity that comes under the general heading "galvanism" and "faradism," with the remark that they are, as a rule, free from danger, and their practice by those of mediocre understanding leads merely to results that fall far short of those attainable by a fully qualified doctor who is an adept at this particular branch of medical study.

When we come to the subject of diathermy and artificial phototherapy, however, the case is much more serious.

The diathermy current is being used more and more as time goes on, and it is found to be of great value in stimulating the physiological action of certain tissues, and as a destructive agent in various "surgical" operations.

Fortunately the nature of the application in these "surgical" methods places them out of reach of the unqualified operator, but the "physiological" application of this current—that is to say, the passage of moderate diathermy current through portions of the body in the treatment of rheumatoid and other affections—is constantly carried out by masseuses, and entails much danger to the patients.

The effect of the current is to raise the temperature of the deep tissues through which it passes. If the current is applied through the skin by means of large electrodes the heating effect on the skin may be slight, but deep tissues traversed by the current may be heated up to the point of destruction without any sensation of pain or discomfort being felt by the patient.

Not very long ago I saw a patient who had been treated by a masseuse for brachial plexus neuritis. Pads had been applied to the outer aspect of each shoulder, and the diathermy current passed through the shoulder-joints and intermediate cervical region between the two pads. The arms had been placed in such a position that the current had been concentrated through the shoulder-joints. No pain was felt, but after several treatments one of the shoulder-joints was rigidly ankylosed by the destruction and sealing up of the synovial membrane and capsule, the condition being absolutely incurable. The movement of the opposite shoulder was permanently limited.

When the current is passed through the sacral region in a careless manner between electrodes placed on the sacrum and the vesical region of the abdomen in front, or else from hip to hip, there is a great danger of concentration of the current through knuckles of gas-filled intestine. The result of this may easily be ulceration and adhesions coming on at a later date and quite unsuspected by the doctor whom the patient may consult for the serious symptoms that ensue. Again, the simple passage of more than a safe amperage through, say, the ankle-joint, may seal up lymphatic vessels, with permanent and serious results.

The board of examiners of the Chartered Society of Massage and Medical Gymnastics, after special consultation, decided to exclude diathermy from the curriculum and examination of the massage students, yet large numbers of them practise it daily.

The pity is all the greater because in the safe and competent hands of a doctor who has specialized in this form of treatment, diathermy is magnificently successful in many cases of chronic inflammation.

Phototherapy is another form of treatment that offers much danger to the patient in incompetent hands. The constitutional effect of treating the skin by ultra-violet rays is obtained by the radiation of cholesterol in the cutaneous cells. A factor is produced which profoundly influences the general nutrition of the body. Many patients are very sensitive to this factor. The danger of overdose arises particularly when the skin has ceased to be inflamed by any ordinary intensity or duration of the radiation. The constant production and absorption of the factor above referred to in excessive doses may then produce marked symptoms of malaise and exhaustion in even a healthy person. In those who are already ill the result is often very harmful. Patients who are losing weight under a certain dosage may put on weight when the dosage is reduced.

The symptoms produced by phototherapy being (except the easily detected dermatitis) constitutional, the treatment should therefore only be given by doctors, or properly qualified hospital nurses, who are trained to observe them. To place it in the hands of others is a great mistake. Even the trained nurse should have the actual supervision of a doctor who has really studied the treatment, and the growing tendency of nurses to set up in "private practice" with clinics of their own is much to be deprecated. In the case of the masseuse the danger is infinitely worse.

Consideration of what has been said here must surely lead to much uneasiness as to the direction in which physical treatment is drifting.—I am, etc.,

G. MURRAY LEVICK.

London, W.1., Nov. 28th.

ERYTHEMA NODOSUM IN MEMBERS OF A FAMILY.

SIR,—In his interesting communication on this subject (BRITISH MEDICAL JOURNAL, December 4th, p. 1049) Mr. D. Gordon Robinson states that on searching the literature he can find no record of such a seemingly "infectious" nature of erythema nodosum. In the *British Journal of Children's Diseases*, London, 1925, xxii, p. 133, after referring to the association of erythema nodosum with various infectious microbic septicaemias besides "tuberculous bacillaemia," I wrote:

"In many cases, however, the cause or causes of erythema nodosum remain altogether obscure, so that there is some justification for the term 'nodal fever' (*febris nodosa*), introduced by Dr. A. A. Lendon in 1905. . . . Such a view would account for the occasional small epidemic outbreaks, such as have been described by E. Ledoux (*Revue de Médecine*, Paris, 1923, xl, p. 321). A familial constitution ('familial soil'), in addition to familial exposure to infection, might help to account for familial occurrence, as that noted by P. Woringer in his paper on familial erythema nodosum (*Journ. de méd. de Paris*, 1923, xlii, p. 241)."

—I am, etc.,

F. PARKES WEBER.

London, W.1, Dec. 5th.

TREATMENT OF ACUTE POLIOMYELITIS.

SIR,—There are certain statements in Sir Robert Jones's letter in your issue of November 27th (p. 1018) which, coming as they do from such an acknowledged authority, will become axiomatic in the treatment of acute poliomyelitis unless they are shown to rest on an incomplete appreciation of the recent developments and possibilities of electro-physics in relation to physiology.

The first of these is the statement that "it is certain that the child is in considerable danger from premature massage and electricity." A patient suffering from acute poliomyelitis is in no danger from either the one or the other, provided always that a fully medically qualified physio- or electro-therapeutist be consulted, as he is, or should be, equally aware with the orthopaedic surgeon of the need for complete rest and the importance of refraining from any procedure involving exposure, movement, or stimulation.

A MEDICAL ASPECT OF MINERS' SHORTER HOURS.

SIR,—The conclusion of Dr. G. Arbour Stephens, in his letter in the BRITISH MEDICAL JOURNAL of November 13th (p. 906), is that the nine-hour day is better for the miners than the seven-hour day, because it is less exhausting, enables food to be partaken of when underground, and lessens the "pace" of the work. Dr. Stephens claims that these factors, together with certain recent methods of working the coal, result in more colliers giving up day-work for piece-work on account of heart and nerve trouble at 50 years of age. Obviously, medical data are not forthcoming and need to be collected before his conclusions can be seriously considered.

There is, however, another medical aspect to shorter hours—namely, the number of accidents arising from industrial fatigue. The Labour Research Department in a circular of August, 1926 (p. 171), states that there are no properly analysed and comparative statistics of industrial fatigue for coal-mining. There is, however, clear general evidence that what matters is the cumulative strain of longer working hours. This shows itself in the reduction of the total number of accidents following on the reduction of hours in 1919. (See Mines Department Report below.)

There is shown to be a reduction in all accidents when the seven hours became operative. From 1922 onwards there has been a worsening of the miners' wages; their endurance has been weakened and the result has been more accidents. Both lower wages and longer hours lower the average physical condition.

Accidents at All Mines.

Average.	Fatal Accidents per 100,000 Employed.	No. Seriously Injured per 1,000 Employed.	No. Injured per 1,000.
1908-1912	136.3	5.6	145.6
1919	154.5	5.1	154.9
1920	97.5	3.6	97.7
1922	89.0	3.5	93.8
1923	94.8	4.1	158.6
1924	97.7	4.3	172.9
		4.0	158.2

Figures for 1921 are not included as they were affected by the stoppage.—I am, etc.,

Plymouth, Nov. 20th. F. G. BUSHNELL, M.D.

THE THEORY OF DIAGNOSIS.

SIR,—Dr. F. G. Crookshank's Bradshaw Lecture, as reported in the BRITISH MEDICAL JOURNAL of November 20th (p. 955), bristles with interest. I see he states that Galen was himself largely "to blame" for the woodenness into which mediaeval Galenism lapsed; this will be news to many people, as I think it has been always understood that the fault lay essentially with Galen's successors.

But this by the way. Dr. Crookshank's address was mainly a brave plea for nominalism (or, more exactly, conceptualism à la William of Occam). In other words, it was a convincing attack on present-day entity-worship in medicine—on the dangerous tendency shown by our art to become dominated by words. There is one other point. Do those who agree with Dr. Crookshank's contention also realize how the danger is being added to by the growing bureaucratization of medicine, with its insistence on schedule-filling, "exact diagnosis," etc.? After all, is not this largely a psychological matter, and, if so, what have the psychologists to say about it?—I am, etc.,

North Queensferry, Fife, Nov. 23rd. A. J. BROCK.

APPENDICITIS AND VEGETARIANISM.

SIR,—Mr. Hamilton Bailey's letter in the JOURNAL of September 18th (p. 545) is of particular interest to those practising in India. In certain parts of India a fair proportion of the people is strictly vegetarian, and the occurrence of appendicitis among them is not an uncommon thing, though not so common as in Western countries. During the last two months I have operated upon two cases of recurrent appendicitis, and both the patients were lifelong vegetarians.—I am, etc.,

Sadra, India, Oct. 18th D. D. VARIAVA, F.R.C.S.Edin.

SIR,—The infrequency of appendicitis among natives of India, to which further reference was made in your issue of December 4th, is undoubtedly a very definite fact. On several occasions on which I held charge of surgical work among Indian troops I was struck by the quiescence of their appendixes. I have seen one or two cases among Gurkhas, who are certainly Northerners though hardly Indians; but during one appointment, lasting over twelve months, as surgical specialist for Indian troops, Rawalpindi Divisional Area, I did not find cause to remove a single appendix.

In my experience the immunity, as far as army personnel is concerned, appears to fall fairly evenly on all natives, although the martial Northern races naturally come under wider review.—I am, etc.,

London, N.W.3, Dec. 5th. B. FRASER BEATSON, Major, late I.M.S.

Obituary.

DR. LIONEL WYKEHAM HAYWARD, who died at Adelaide, on September 12th, aged 45, was the second son of Colonel W. T. Hayward, C.M.G., LL.D., at one time chairman of the Australian Federal Committee, and well known to many members of the British Medical Association in England. He was educated at St. Peter's College, and graduated M.B., B.S. of the University of Adelaide. After practising for some time at Port Adelaide his health broke down, and he went up country to Loxton, where he became closely associated with the tuberculosis sanatoriums at Bedford Park and Myrtle Bank. He took an active part in the founding of the Tubercular Soldiers' Association in 1920, and until the time of his death remained closely connected with it. Dr. Lionel Hayward was a strong advocate of the provision of permanent pensions for this disability and a keen supporter of preventive work, particularly among the young. Like his father he was a member of the South Australian Branch of the British Medical Association. His brother, Dr. Lancelot Hayward, is in practice at Perth, Western Australia.

DR. FREDERICK HARRISON TETLEY died on October 4th at the age of 74. He received his medical education at Glasgow, and obtained the L.R.C.P. and L.R.C.S.Ed. diplomas in 1877. He practised in Bungay for ten years, during which time he was surgeon, and later, consulting surgeon, to the Hallows Hospital, Ditchingham. In consequence of the failing health of his wife he gave up that practice in 1901, and the ten years spent the winters abroad, chiefly in Las Palmas, where he continued to practise and served as honorary surgeon to the Victoria Hospital to Seamen. He then retired from practice and devoted himself to travelling until the onset of the war, when he resumed his medical work, and for eighteen months carried on the practice of Dr. T. L. Ingram at Walford, near Rugby. After the death of Dr. Ingram, who was killed in action in 1916, Dr. Tetley was appointed surgeon to the Guards at Caterham, and subsequently became physician to the City of London Hospital at Epsom, where he contracted typhus, which affected his health for some years. He also acted as chairman of medical boards in various parts of the country, and after the war served in the same capacity on pensions boards at Portsmouth, Dover, and elsewhere.

DR. WALTER ERNEST FRY, who died on November 11th, after a short illness, was born in 1869, and received his medical education at the London Hospital, obtaining the diplomas M.R.C.S., L.R.C.P. in 1893, and the D.P.H. in 1909. After experience as clinical assistant in the medical and ear departments of the London Hospital, resident clinical assistant to the Queen's Hospital for Children, and clinical assistant to the medical department of the West

than anything else; we cannot announce our claims to the local world as we take our place in the practitioner ranks, but we are thankful to get the opportunity of doing surgical work when it comes our way.

I have known a lady whose appendix was removed by a consulting surgeon "as a placebo." (He told me so.) I met her accidentally through the nurse sending for me (as an emergency) because the patient had a severe secondary haemorrhage in the region of a post-operation faecal fistula. I tied the artery and reported to the surgeon, who had been unable to come himself. Accidents will happen, but suppose this state of affairs had occurred to a general practitioner's case? He would probably cease doing appendicectomies! But do not these pronouncements from some of the consulting class, whether on surgery or on obstetrics, savour of an intolerable egotism?

The general practitioner is usually the unpaid agency through which many cases are introduced to the consultant. There are many consultants—surgeons and non-surgeons—whom it is not only a pleasure but an education for me as a general practitioner to meet professionally, and most men in general practice will endorse this view. But in every class, political or surgical, there are irritating extremists to be found.—I am, etc.,

Swansea, Dec. 4th. L. W. HEFFERMAN.

TEAM WORK IN A SMALL HOSPITAL.

SIR,—Your correspondents have already made a strong protest against the remarks of Sir James Berry severely criticizing the work of the operating general practitioner. My object in writing is to suggest a policy that will enable the operating practitioner to increase his usefulness and enlarge the scope of his activities. This policy has been adopted and is working well in a small provincial hospital of eighty beds. After the great war, when practically all the staff had served in France or the Far East, the advantage of team work was realized, and we tried to put our house in order. As five at least of the staff of ten honorary physicians and surgeons had acted as surgical specialists in the R.A.M.C., there was little difficulty in inaugurating a scheme of work.

The details of the arrangement are, briefly: Each member of the staff is to devote himself, in addition to his ordinary routine, to one special branch of surgery or medicine. We have therefore the following departments: (1) Diseases of children; (2) diseases of women; (3) nose, throat, and ear; (4) radiology and electro-therapeutics; (5) eye department; (6) venereal diseases; (7) pathological department; (8) urinary diseases; (9) orthopaedics.

Each member of the staff took the subject in which his inclination and previous experience enabled him to make a good beginning in the specialty of his choice. The municipal authorities have already recognized the value of the system by appointing those of the staff whose work justified the choice to do special obstetric, throat and ear, and eye work in connexion with school children and other activities of the medical officer of health. This happy arrangement has only been rendered possible by good feeling and professional enthusiasm in a body of men who take a pride in their local hospital.—I am, etc.,

Lowestoft, Dec. 6th. H. MUIR EVANS.

SANATORIUM TREATMENT.

SIR,—It is with diffidence that I again make use of your columns on this subject, but I think Dr. Clarke's letter (November 27th) calls for a reply.

I have been accused by Dr. Gillespie (October 30th) of "resorting to a controversial device"; whether I did misrepresent him as saying what he did not say I am content to let your readers decide, but I will reply to Dr. Clarke's points by a method which presumably I may be allowed to use without question, by producing statistical evidence, much of which can be found in the memoir itself.

1. Though it is true that the *mean* time before admission of the incipient group of patients to sanatorium was as stated by Dr. Clarke, 114 out of the 170 cases, or two-thirds, were admitted within six months, and 97, or 57 per cent., within three months of their first visit and classification. In considering histories over a long period like six years the *mean* latent period gives an erroneous impression, since it is unduly increased by a very small group of cases admitted three, four, or five years after first coming under observation.

2. The progress of the 114 cases admitted within six months, 85 per cent. of whom were admitted within three months, has been separately assessed in Tables III to VII, and their progress shown to be apparently no better than those admitted after a longer delay or not at all. A considerable proportion of these cases (about 75 per cent.) were recommended for sanatorium immediately, on the basis of the first examination, allowing no opportunity for selection on the basis of progress such as Dr. Clarke postulates.

3. The possibility of such selection coming in, which he says we "appear to have forgotten," is, in fact, examined on p. 440 of the memoir by the most accurate method available for such purpose—namely, by measuring the fall in weight of adult patients subsequently chosen for sanatorium in the interval between first visit and admission. For incipient cases this fall in weight averaged about half a pound, as compared with a mean increase of about the same amount in those not chosen for sanatorium (over a similar period), and the conclusion was that "the average loss here is too small to be appreciable in influencing selection" (p. 440), and certainly too small to be responsible for any considerable differences in ultimate progress of the groups.

4. In case body-weight be objected to as an insufficient index of progress during the waiting period, my colleague Miss N. Karn has taken out the following figures for adult male patients, using the general assessment of progress employed in the memoir.

Percentage of Adult Male Patients Classified as "Stationary or Worse" amongst the Total Still Alive and Under Observation.

	During first 3 months.			During second 3 months.
	L_1.	L_2.	L_1 and L_2.	L_1 and L_2.
Men subsequently sent to sanatorium	59.1 ± 7.1	63·5 ± 4.5	62.2 ± 3.8	53.2 ± 3.8
Men not so sent	54.8 ± 5.2	64.9 ± 3.1	62.1 ± 2.6	55.6 ± 3.1

There are no significant differences here, and I think I have said enough to prove that the manner in which the patients were progressing between classification and selection for sanatorium was actually not a factor of much importance in that selection.

The question as to whether the "methods of reasoning" used in the memoir are "faulty" or otherwise can be safely left for experts in such matters to decide. One thing, however, is certain: if the ultimate curative value of sanatorium treatment for patients in the aggregate cannot be proved by statistical methods it cannot be proved at all. I would venture to suggest that a more convincing and useful form of argument than any of those which have been used would be the production of other figures which, to the satisfaction of experts, lead to a conclusion contrary to the one we have reached. It cannot be denied that the difficulties to be faced in such an inquiry are very considerable, but they are not insurmountable, and the issues involved are of sufficient magnitude to justify repeated attempts and the expenditure of much ingenuity and labour in an effort to reach the truth. If the present discussion has done anything to make clear the need for a repetition of this investigation by similar or improved methods on other municipal tuberculosis records, it will not have been fruitless. To throw doubt on the real curative efficacy of sanatoriums without being able to suggest a better substitute must be a task neither inspiring nor congenial, but to continue to leave in doubt a matter of such importance through lack of the courage or will to face it is a policy which will do us no credit.—I am, etc.,

PERCY STOCKS.

Galton Laboratory, University College, London.
Nov. 29th.

UNIVERSITY OF ABERDEEN.

THE Munday Prize in the Faculty of Medicine has been awarded to Frances E. Bruce and John H. Otty (equal) and the Venn Prize in the same Faculty to Brenuan S. Crau and Antoine F. Emmanuel (equal).

Professor Marnoch has been appointed and Professor Mackintosh reappointed assessors to the University Court, the former for the period to November, 1928, in succession to Professor Matthew Hay, and the latter for the period to November, 1930.

UNIVERSITY OF DUBLIN.

SCHOOL OF PHYSIC, TRINITY COLLEGE.

F. W. PIENAAR has been approved for the degree of Master in Obstetric Science (M.A.O.).

The following candidates have been approved in Part II of the Final Medical Examination:

M.B.—E. G. Montgomery, Margaret H. Donaldson, E. P. N. M. Early, J. C. T. Sanctuary, M. L. M'Cauley, S. Margaret E. Deane-Oliver, J. B. Patrick, D. Blewitt, Rachel E. Porter, J. J. FitzGerald, R. Kahn, S. Gurevich, J. O. Bennett, H. A. Ferguson, R. A. J. Holmes-Ievers, J. Quigley, G. D. Edwards, C. F. M. Wilson, M. Hoffman, Kathleen R. Byrne.

B.CH.—*V. St. G. Vaughan, L. B. Somerville-Large, E. H. Harte, V. G. Horan, A. J. Conlin, Stella C. Ross, Annette K. Wood-Martin, E. P. N. M. Early, E. W. Bingham, E. G. Montgomery, A. N. B. Odbert, Norah M. Smith, A. R. Gray, A. E. A. O'Byrne, J. B. Patrick, D. A. O'C. Quinlan, E. A. Ellis, Rachel E. Porter, W. F. Knobel, Gladys L. Craig, J. Johnston, J. J. O'Dwyer, C. F. M. Wilson.

B.A.O.—*W. F. Lane, *L. R. S. MacFarlane, *R. S. F. Hennessey, *T. C. M. Corbet, *S. D. K. Roberts, Wilfreda D. C. T. Pigott, G. M. Smith, I. Isaacson, P. Brangan, G. H. Henry, J. H. Stephens, M. F. N. Griffin, C. L. Day, Christina M'Donald, Ethel M. Weir, L. R. Brumberg, H. C. Weir, G. M'Donald, S. R. Elmes, D. M. Brink, A. Sachs, T. J. O'Reilly, J. O. Bennett, A. C. C. Charles, S. B. Dalrymple, Norah W. Brown, C. F. Cope.

* Passed on high marks.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.

THE annual meeting of the Royal College of Physicians of Edinburgh was held on December 2nd. Dr. George M. Robertson was re-elected President for the ensuing year; Sir Robert Philip was nominated Vice-President; Drs. G. Lovell Gulland, R. A. Fleming, Robert Thin, John Orr, and Edwin Matthew were re-elected to form the Council.

At an extraordinary meeting held the same day Drs. Edward Arnold Carmichael and John Robert Lord, C.B.E., were elected Fellows of the College. Drs. William Russell and John Orr were elected representatives on the board of management of the Royal Infirmary of Edinburgh.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.

AT the monthly business meeting of the College on December 3rd the President duly admitted to the Licences in Medicine and Midwifery the following successful candidates at the Winter Final Examination under the Conjoint Scheme with the Royal College of Surgeons in Ireland:

D. P. P. Barry, J. J. Lee, P. H. M. McEntee.

The Services.

MEDICAL DIRECTOR-GENERAL, R.N.

UNDER revised regulations for the retirement of officers, the Medical Director-General of the Royal Navy is to be retired on ceasing to hold the appointment, or, if not previously superseded in the appointment, to vacate it and be retired on attaining the age of 65.

DEATHS IN THE SERVICES.

Surgeon Commander William Henry Daw, R.N. (ret.), died at Lydford on November 14th. He was educated at the London Hospital, where he was scholar in practical anatomy in 1894; after taking the M.R.C.S., the L.R.C.P.Lond., and the L.S.A., in 1895, he served successively as house-surgeon at the London Hospital, house-physician and resident medical officer at the Royal Hospital for Diseases of the Chest, and surgeon to the Royal National Mission to Deep Sea Fishermen; afterwards he entered the navy as surgeon. He attained the rank of surgeon commander in 1912, and retired some six years ago. He was the author of a small work, *The Care of Consumptives*, and of the articles on adenoids and cretinism in *The Complete System of Nursing*.

Colonel Denis Moriarty O'Callaghan, C.M.G., Army Medical Service (ret.), died at Budleigh Salterton on November 6th, aged 64. He was the youngest son of the late Robert O'Callaghan, LL.D., of Holton, Suffolk. He was educated at Queen's College, Cork, and at the Carmichael School, Dublin, and took the L.R.C.S.I. in 1884 and the L.K.Q.C.P. in 1885. He entered the army as surgeon on July 28th, 1886, was gazetted colonel in the long war promotion list of March 1st, 1915, and retired on November 11th, 1918. He had a long list of war services: Ashanti expedition, 1895-96 (star); Nile campaign of 1898, battle of Khartoum, mentioned in dispatches in the *London Gazette* of September 30th, 1898 (medal, Egyptian medal with clasp); South African war, 1900-01, operations in Orange River Colony, including action at Wittebergen, and in Cape Colony (Queen's medal with three clasps); war of 1914-18, mentioned in dispatches four times, and received the C.M.G. on June 3rd, 1917.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

THE principal debate in the House of Commons this week was on the vote of censure moved by the Labour party on December 8th, which challenged the conduct of the Government during the coal dispute. The official end of that dispute was marked on December 10th by the submission to the House of a resolution approving the cancellation of the Emergency Regulations.

On December 6th the Housing (Rural Workers) Bill, the Public Health (Smoke Abatement) Bill, and the Prisons (Scotland) Bill were passed through Report and third reading by the House of Commons. On December 7th the University of London Bill was read a third time and passed, and several small bills were advanced. Thursday and Friday were assigned to the remaining stages of the Judicial Proceedings (Regulation of Reports) Bill, the purpose of which is to prevent full reports of divorce cases where publication may do harm.

In the House of Lords the Workmen's Compensation (No. 2) Bill passed through Report on December 6th. The Births and Deaths Registration Bill was read a second time on December 7th.

The Coroners Bill was considered in a Standing Committee of the House of Commons on December 7th, and was set down again for December 8th.

Housing Subsidy.

In the House of Commons, on December 2nd, Mr. Neville Chamberlain moved a resolution approving the draft order of the Minister of Health and of the Scottish Board of Health (presented on November 25th) which proposed to reduce the housing subsidy after next September by £2 in the £6 annual subsidy for twenty years under the 1923 scheme, and by £1 10s. in the £9 subsidy for forty years under the 1924 scheme. So long as it was understood that the subsidy would continue to be paid until the demand for houses was satisfied or until the price fell, there would be no fall in the price of houses. Mr. Wheatley said that national interest demanded healthy housing for the working class. The needs of London were estimated at 72,000 houses. Manchester still required 46,000 houses, and Liverpool had a waiting list of 20,000 applicants, every one of whom had at least two children. The case of Birmingham was equally bad. Leeds had 33,000 back-to-back houses, which it could not demolish till there were houses for the displaced population. He opposed the motion. Lord Henry Cavendish-Bentinck said Nottingham had 4,000 applicants on its waiting list and 3,000 houses unfit for human habitation. In Middlesbrough, of 1,679 tuberculous patients on the register, 486 were sleeping in beds along with persons who were not tuberculous. There were 220 houses each occupied by two families, and in each one family had tuberculous patients. In Birmingham Sir John Robertson reported that he had investigated a group of 527 houses, of which 130 were uninhabitable. Mr. Charleton said that in Leeds health corresponded exactly with the district of residence. Mr. Harris said that in London the pressure on housing had been as great during the last twelve months as in the year before. In the past year the London County Council had received 120,000 personal or written applications for housing accommodation. The L.C.C. list had been closed for some months. Mr. Montague said the nation was paying £80,000,000 to £86,000,000 annually for social services, and a great part of that expenditure was due to the bad health and inefficiency which came from overcrowding and bad housing. Mr. Gibbins said that in Liverpool houses which had long been condemned were still occupied by three or four families. Commander Kenworthy spoke of visiting houses in Hull, a hundred years old, with only one water-tap in a yard shared between twenty houses and with disgraceful sanitary arrangements. Dr. Haden Guest said that the arrears in normal housing had not been overtaken; housing was a living nightmare for the people. Mr. Greenwood said a large proportion of the Addison houses were occupied by bank clerks and professional people because the rents were too high for working-class people to pay. The rents of municipal houses were too high. In Nottingham, out of 4,500 applicants for houses, 1,300 wished to move from corporation houses into smaller and worse houses because they would be cheaper. Dr. Fremantle had made an estimate, which had never been refuted, that the annual cost of sickness to this country was £150,000,000, and Mr. Greenwood asserted that sum to be spent largely through the housing conditions. The late Mr. C. P. Childe, in his presidential address to the British Medical Association, had said the country could spend without loss £50,000,000 annually in clearing slum areas if thereby the cost of sickness and disablement were reduced by a third. Sir Kingsley Wood said that it was vital to the poorer members of the community that the cost of building should be reduced. Of 768,000 new houses built in this country since the war, nearly half had been completed in the last two years. The indications were that during the next twelve months the 200,000 mark would be passed. A Labour amendment was defeated; and Mr. Chamberlain's motion was carried by 181 to 111.

London Hospital, he practised in Hammersmith, where he served as medical officer to the infant welfare centre since its commencement in 1911. He was surgeon to the throat and ear department of the London County Council school clinic, surgeon to the Parkside Maternity Hospital, medical officer to the Hammersmith school for mothers, and honorary secretary of the Hammersmith District Nursing Association; he had also acted as honorary secretary to the West London Medico-Chirurgical Society. For many years he gave active support to the British Medical Association, and was a member of the Metropolitan Counties Branch Council from 1913 to 1919, and again in the present year; he was vice-president of the Branch in 1921. From 1913 to 1919 he was honorary secretary and treasurer of the Kensington Division, and chairman from 1922 to 1925. Dr. Fry was a deputy representative from 1921 to 1925. He leaves a widow, one son, and two daughters.

Dr. C. J. LINTON PALMER of Stoke House, Gosport, who died on November 12th, aged 54, from pneumonia, was educated at University College, Liverpool, and took the diplomas of the English Conjoint Board in 1898. He served as resident medical officer at the City Hospital for Infectious Diseases, Parkhill, Liverpool, and later became resident medical officer to the lock, eye, and ear department and house-surgeon of the Liverpool Royal Infirmary. He removed to Gosport just before the war, and when hostilities broke out he became civil medical practitioner in charge of troops in the Gosport district. He subsequently took a temporary commission in the R.A.M.C., and served on the small hospital ships plying between Dover and Boulogne. Dr. Palmer was a member of the Portsmouth Division of the British Medical Association. He is survived by his widow and two children. The funeral service was attended by a large congregation representing all sections of the community.

Dr. RICHARD JONES OWEN, formerly of the Army Medical Department, died in London on November 17th, aged 87. He was the son of Dr. Owen Owen, took the M.R.C.S. and L.S.A. in 1861, and entered the army as assistant surgeon on March 31st, 1862, serving in the Royal Artillery, but resigned his commission on December 1st, 1865, over sixty years ago. He subsequently went to Australia, where he was in practice at Ballarat, Victoria, the famous goldfield for several years, and surgeon to the Ballarat Hospital; but retired from practice long ago. His name disappeared from the *Medical Directory* in 1883.

Dr. JAMES DOIG MCCRINDLE, who died at his residence in Northampton on November 19th, at the age of 53, received his medical education at Edinburgh University and Guy's Hospital. He graduated M.B., C.M.Edin. in 1896, and obtained the D.P.H.Camb. in 1901. In 1897 he was appointed resident medical officer of the Birmingham City Hospital for Infectious Diseases, and held similar appointments at Nottingham from 1898 to 1900, and at Croydon from 1900 to 1902; at the latter place he was also bacteriologist and deputy medical officer of health. He was appointed medical superintendent of the Birmingham City Small-pox Hospital in 1902, and two years later became assistant medical officer of health. In 1907 he went to Northampton as medical officer of health, which post he held until his death. He was a prime mover in the establishment of the Creaton Sanatorium, which was built by voluntary subscription in 1910, and he remained an active member of the executive committee of this institution. He was a member of the South Midland Branch Council of the British Medical Association.

Mr. EDWIN WEISE COATHUPE, who died on November 23rd at Boscombe, was born as long ago as 1837. After studying medicine in the medical school and Royal Infirmary at Bristol, he obtained the diploma of M.R.C.S. in 1859. He was then appointed assistant surgeon to the Tredegar Iron Works, but, three years later, gave up medical practice and was appointed to the detective branch of the Metropolitan Police, which at that time consisted of two inspectors and ten sergeants. After three years' service in London he returned to Tredegar as chief surgeon, but a year later resigned this appointment in order to become chief constable of Manchester at the time of the Fenian outrages. In 1876 he was chosen out of 122 candidates as chief constable of Bristol, an office which he held until 1894. After his retirement he lived abroad for some years, principally in Rome. During his period of office at Bristol the police force there doubled in size and was entirely remodelled. In accordance with his suggestion the city was divided into divisions, the rank of superintendent created, and the police fire brigade and the river police were established. He also introduced the general use of police vans, and was responsible for a great advance in the reputation of the police system in Bristol; many men trained by him obtained high positions in various parts of the country. At his retirement he was presented with an address and a cheque by the Bristol justices. We know of no other instance of a medical man quitting the practice of his profession for service in the police force and becoming a chief constable.

Dr. ALEXANDER LAWRENCE died at Chester on November 23rd, aged 81 years. He was born at Cullen, Banffshire, in 1845, and was educated at Aberdeen University, where he graduated M.A. in 1866, M.B., C.M. in 1869, and M.D. in 1872. After serving as clinical clerk to the West Riding Asylum, Wakefield, and superintendent of Chalmers Hospital, Banff, he became second assistant medical officer to the County Asylum, Chester, in 1870, and twenty-five years later succeeded Dr. Davidson as medical superintendent. In June, 1910, he retired on superannuation, when a presentation was made to him by the asylum visiting committee and staff. He was for many years a member of the Chester Society of Natural Science, and of the Chester Division of the British Medical Association.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE.

AT a congregation held on November 27th the following medical degrees were conferred:

M.B., B.CHIR.—H. Cowell R. Youngman.

The number of medical students in the University this term is 457. Of these 163 are in their first year, 142 in their second, and 115 in their third year; there are 26 fourth-year medical students, and 11 in their fifth or later years.

UNIVERSITY OF LONDON.

THE Paul Philip Reitlinger Prize, offered this year for the best essay embodying the result of some research work on a medical subject carried out by the candidate, has been awarded to William Stewart Duke Elder, M.A., M.D., F.R.C.S., who is now working at University College, London, for his essay on "The ocular circulation: its normal pressure relationships and their physiological significance." Next year the prize will be awarded for the best essay on "The nature of belief and its place in human experience."

The following candidates have been approved at the examination indicated:

DIPLOMA IN PSYCHOLOGICAL MEDICINE.—(*With special knowledge of Psychiatry*): R. G. Anderson, D. H. Cameron, H. Harris. (*With special knowledge of Mental Deficiency*): R. M. Macfarlane.

UNIVERSITY OF BIRMINGHAM.

DR. OSCAR BRENNER has been appointed part-time assistant and Mr. Cedric C. Harries assistant to the Department of Pathology and Bacteriology.

Professor G. Elliot Smith, M.D., F.R.S., will deliver the Huxley Lecture in the medical theatre of the University on February 1st, 1927, at 5.30 p.m.

UNIVERSITY OF EDINBURGH.

THE following candidates have been approved at the examination indicated:

FINAL M.B., CH.B.—H. El S. Abaza, J. du R. Ackermann, A. Ahmed, J. B. Annan, T. W. Banks, F. W. Clark, A. R. Cowan, I. R. Duthie, V. Dyream, W. D. Forsyth, E. H. Griffiths, Euphemia T. Guild, Janet W. Jackson, Eva G. John, Isabella M. Marshall, E. P. L. Masson, W. H. Moore, Katherine M. Muirhead, K. B. Mukerjee, G. Nahapiet, J. G. Paul, M. R. J. Peters, F. W. Pringle, W. H. Rees, Janet C. Ronaldson, Roma M. Ross, G. A. Ryrie, J. Singh, Marie Steven, F. Sutherland, Winifred E. Wall, Marjorie S. Waterston.

ments for the reception of children in other ways. The deficiency was serious, and pressure was being exerted on the county councils to provide institutions. After further minor amendments the bill was reported to the House.

Smoke Abatement Bill.

The House of Commons, on December 1st, commenced to consider the Public Health (Smoke Abatement) Bill as amended in Committee. Mr. Scurr said the bill was in many ways admirable. An agreement had been made for exempting certain processes in Sheffield, but there was no justification for giving the Minister power, as the bill did, to exempt other industrial processes. Sir Kingsley Wood said the final word would remain with Parliament. When consideration of the bill was resumed on December 6th Mr. Scurr's amendment was defeated. Rear-Admiral Beamish moved an amendment to bring within the scope of the bill the chimneys of domestic dwelling-houses in London. It was high time to make the same effort in regard to smoke as had been made in regard to drains. Sir A. Holbrook seconded the amendment.

Mr. Chamberlain said that the amendment would apply only to London and would deal, not with new houses only, but with all houses, and was therefore quite impracticable on account of the cost. A further difficulty was that there would not be enough gas and electricity to go round. The amendment was negatived.

Sir A. Holbrook moved to include private dwelling-houses in Clause 5, which gives the urban authorities power to make by-laws requiring the provision in new buildings of such arrangements for heating or cooking as were calculated to prevent or reduce the emission of smoke. The motion was supported by Mr. Hardie.

Dr. Haden Guest said that the effect of the exclusion of houses would be that the smoke trouble would not be abated for a very long time. The direct effect of smoke was to cause a large increase in certain respiratory and other diseases. The indirect effect of smoke, especially in London and the greater towns, by cutting off the rays of the sun, was to produce disease of a rather different character, not directly respiratory. These two factors alone, if it were possible to abolish smoke at an early date, would increase the health and efficiency of the country to such an extent as would make a substantial reduction in the amount of money actually paid in sickness insurance, for hospitals, and in other ways.

Mr. Chamberlain said that while it was perfectly true that domestic smoke was responsible for much more of the smoke nuisance than industrial smoke, yet that smoke was produced by the chimneys of some 8,500,000 existing houses in the country. The amendment only applied to new houses. It might be assumed that the number of new houses erected by local authorities provided for the methods which they desired to be employed in them, while a large number of houses erected by private enterprise were fitted with exactly the same appliances. Therefore only a trifling number of houses a year could possibly be affected by the amendment. It was not the function of the bill to provide for smokeless fuel. The Department of Scientific and Industrial Research was devoting its attention and spending a substantial sum of money in investigating this subject. If a certain proportion of houses now built by private enterprise had the open fire instead of the gas fire, it was because the people who inhabited them desired it, and he was not prepared to deny it to them until there was a reasonably cheap, economic, and satisfactory alternative.

The amendment was rejected by a majority of 138.

On the motion of Lieutenant-Commander Astbury, the coming into operation of the bill was postponed from January 1st to July 1st next.

The bill was afterwards read the third time.

Lead Paint Bill.

Mr. Rhys Davies asked the Home Secretary why the chief medical officer of the Factories Department of the Home Office resigned his post. Sir W. Joynson-Hicks said the senior medical inspector of factories, having reached the pensionable age, applied to be allowed to retire, giving as his reason that he did not wish to be concerned in the administration of the Lead Paint (Protection against Poisoning) Bill, and his application had been granted. Mr. Rhys Davies asked whether the resignation was not mostly due to the fact that the chief medical officer was at Geneva when the Lead Paint Convention was adopted, and that having carefully negotiated the Convention he felt his honour was in question. The Home Secretary replied: I do not know about his honour. He had reached a pensionable age. He did retire because he did not agree with the views which I have taken and the Government has taken with regard to the matter. I am expressing no opinion on the resignation. He could have served another couple of years possibly. He is quite entitled, if he desires, to resign his position, which he has done.

Infantile Paralysis.—On December 6th Sir Kingsley Wood told Colonel Gretton that no further cases of infantile paralysis had been notified in Rutland since the occurrence of two cases at Uppingham School during the week ended November 13th. In the present state of knowledge of this disease it was the practice of the Ministry of Health to recommend that patients who had been attacked by it should be isolated for six weeks from the onset of the disease. Asked how many cases of encephalomyelitis had been reported during the last six weeks, Mr. Chamberlain answered that encephalomyelitis was a generic term including conditions due to a variety of causes, some of which were not notifiable.

The General Medical Council.—Lord Sandon asked Major Hennessy, as representing the Lord President of the Council, whether the Lord President would select a non-professional member to fill the vacancy in the General Medical Council in January, and when his name would be announced. Major Hennessy said it was impossible to say in advance what action the Lord President might see fit to take when the occasion arose for filling this vacancy. Lord Sandon asked whether this meant that there was no parliamentary control in the matter. No answer was returned.

Experiments on Animals.—In an answer to Captain A. Evans, the Home Secretary said 1,059 vivisection licences were in force. Only one class of licence was issued. Particulars of the different certificates required for certain experiments were issued in the Home Office annual return. Mr. Macquisten asked whether there was any indication of whence the investigators obtained dogs and whether the animals were stolen or not. The Home Secretary said there was no indication. Captain Evans asked whether there were only two vivisection inspectors for the whole of Great Britain, and whether the Home Secretary would consider increasing the number. The Home Secretary said there was a strong tendency against such increases. One laboratory was visited thirty-five times in the last eighteen months, thirty times without notice, which showed the inspectors were doing their work well. In a further reply to Sir Robert Gower, the Home Secretary said he could not give reliable information on the number of dogs reported to the Metropolitan Police as missing or stolen during the past twelve months. Many owners did not notify the police of the return or recovery of a dog. On December 6th Captain Hacking (Under Secretary to the Home Office) stated that since January 1st 823 dogs had been used for experimental purposes in premises within the London area which were registered under the Act. All but a very few of the animals were kept under complete anaesthesia during the whole time of the experiment and were destroyed before recovering from the anaesthesia.

Orthopaedic Treatment of Children.—In a reply to Mr. Gardner, Mr. Chamberlain said that orthopaedic treatment was provided for children of all ages suffering from surgical tuberculosis by the county and county borough councils under their schemes for the institutional treatment of tuberculosis, and for non-tuberculous crippled children under school age by the local authorities responsible for the maternity and child welfare service. It was open to the local education authorities to provide orthopaedic treatment for non-tuberculous children of school age in accordance with arrangements sanctioned by the Board of Education. An Exchequer grant was available in aid of these services amounting to 50 per cent. of the approved expenditure of the local authorities.

Medical Attendance under the Insurance System.—Mr. Chamberlain states that few specific complaints are received by the Ministry of Health regarding the medical attention afforded to panel patients, and nothing has come to his notice since the publication of the Report of the Royal Commission on National Health Insurance which would justify any further inquiry. The Royal Commission exhaustively investigated the efficiency of the medical service under the National Health Insurance Acts, and its report contained a very favourable verdict. He had received no report from the Kent Insurance Committee containing certain complaints in this matter.

Opium in India.—On December 6th Mr. C. Wilson asked whether, as a result of the Government of India's decision to reduce by 10 per cent. per annum the export of opium except for medical and scientific purposes, the imports into British dependencies in the Far East would be proportionately reduced; and whether an assurance could be given that opium for purposes of smoking would not be imported from other sources to compensate for the reduction in the imports from India. Mr. Amery said no such reduction would, in his opinion, be practicable at present.

Research Stations in Palestine and East Africa.—During the debate in Committee of the House of Commons on December 1st, when the Palestine and East Africa loans guarantee was considered, Mr. Ormsby-Gore, for the Colonial Office, said the reason why only a small proportion of the loan was set aside for research was that the Treasury would only give money out of loan funds for capital expenditure in connexion with research. Money would be forthcoming for any further capital re-equipment of the Amani Institute (East Africa), which would be turned into a first-rate scientific research institute, a link in the proposed chain of tropical research stations, of which Trinidad was the first.

Notes in Brief.

Mr. Chamberlain hopes that the report of the committee investigating cases of encephalitis directly following vaccination will be published before long.

The number of pensions awarded to widows in England, Scotland, and Wales is 170,459. These include allowances for 269,100 children. Pensions have been awarded to 15,180 orphans.

The Minister of Health does not propose, as at present advised, to take any action concerning the Foundling Hospital site, as the question of its uses will come before Parliament on a private bill.

The total net cost of combating foot-and-mouth disease during the financial year ending March 31st, 1926, was £311,980.

Owing to the difficulties presented by the traffic problem in London, the Sunday processions making collections for hospitals, which have been made since 1920, will not in future be allowed.

Antimalarial measures undertaken in India by the provincial Governments include prohibition of the cultivation of rice near certain towns, the formation of antimalarial co-operative societies, and the systematic distribution of quinine at low prices. The area under cinchona cultivation is being steadily increased with a view to making India self-supporting in the supply of quinine.

Rural Housing.

In the House of Commons, on December 6th, the Housing (Rural Workers) Bill was considered on the Report stage. Mr. C. Edwards, the Labour member for Bedwellty, moved an amendment providing that no assistance should be given for the repair of a house unless the local authority was satisfied that the house, when altered, would contain a fixed bath and that the walls or other partitions of the bedrooms would comply with the requirements of decency. Mr. Chamberlain, Minister of Health, resisted the amendment. He pointed out that in the Act of 1923 as amended by that of 1924, discretion was given to the Minister with regard to the provision of a fixed bath "in a bathroom." The amendment would give no discretion. If it were carried either a large number of proposals would be scrapped because the owners would not undertake the additional expense, or the fixed bath in a bathroom would be provided at the expense of some other alteration or improvement. In reply to further questions, Mr. Chamberlain said that he would consider whether he should issue a circular to the local authorities expressing an opinion that it was desirable to have a fixed bath in the houses. The amendment was defeated, and the bill was read a third time.

University of London Bill.

The London University Bill was passed through Standing Committee on December 2nd. Lord Eustace Percy (Minister of Education), in discussing its provisions, said a strong memorial, signed by many teachers of the University, pressed for the passage of the bill in the present session, but made one proviso—that the Government should make it clear that the Statutory Commission would have power to consider how the relations of the Council to the Senate should be defined in case of difference of opinion between the two bodies. He did not, however, see how any deadlock could arise, because questions of pure detail within particular university departments would not be dealt with by the Council, but by the Senate; but if the Statutory Commissioners, having laid down the composition of the Council, and having defined that the Council was to have final authority in the allocation of university funds, considered that still there might be danger of a deadlock, they would certainly have power to consider any machinery which might solve that deadlock.

On Clause 4, relating to powers and duties of commissioners, an amendment requiring the commissioners, in framing statutes, to give effect to a number of directions for the constitution of the Senate and its standing committees, as set out in a tabled amendment to the schedule, was negatived.

A new clause making provision as to the appointment by the Crown of members of a council of the University was added to the bill. The bill was read a third time by the House on December 7th.

Insurance Benefits.

Mr. Chamberlain has stated, in answer to questions, that the amounts of sickness and disablement benefits paid to members of approved societies during the first nine months of 1925 and of 1926 could not be given, these figures only being returned for calendar years. From January 1st to September 30th, 1925, £13,046,000 was issued from the National Health Insurance Fund to approved societies in England and Wales to defray the cost of benefits and administration, and for the corresponding period in 1926 £15,740,000. During the same period of 1925 the income from contributions in England and Wales was £18,321,000, and the State contribution was £5,489,000. For the first nine months in 1926 the respective figures were £16,368,000 and £4,725,000.

Mr. Chamberlain told Colonel Applin that the new scale of fees for dental treatment had not been laid down by regulations, but had been reached by agreement between representatives of approved societies and the dental profession. A few societies had not adopted the scale. If it became clear that the adoption of the scale by a society was essential to the provision of a satisfactory service he would take the necessary steps.

The Minister of Health has decided, in view of the coal stoppage and consequent unemployment in various trades, that arrears of contributions under the National Health Insurance Act might be accepted up to January 31st, 1927, in cases where a society was satisfied that the delay in discharging arrears was due to financial difficulty arising out of the industrial situation. This decision was being conveyed to all approved societies.

Sickness Benefit.

Mr. Chamberlain stated, on December 6th, that the total amount of sickness and disablement benefit paid in 1925 to contributors to the National Health Insurance schemes in England and Wales, during periods of illness which rendered the contributors incapable of work, was, approximately, £13,849,000. It was estimated that the total number of weeks of sickness represented by this payment was upwards of 25,000,000. In making this estimate account had to be taken of a number of uncertain factors, and the result could only be regarded as a rough approximation.

In reply to another question, he said that it was an essential feature of the National Health Insurance Act that money payable by way of benefit should not be diverted to Poor Law authorities or otherwise used to relieve local rates. Benefit was not assignable.

Dental Benefit.

In an answer to Mr. Rhys Davies, Sir K. Wood said the new agreement on the scale of charges and conditions of service for the dental treatment of members of approved societies was arrived at by direct negotiation between representatives of the societies and of the dental profession. It involved some increased charge on the surplus funds of societies above that which would have arisen under the scale previously in operation, but the great majority of societies thought the additional advantages to be secured under the new arrangement justified the extra cost. A few societies had not yet decided to adopt the new scale, but the Minister of Health did not think that the position called for any special action on his part at present. There was no reason to apprehend that the other societies, representing about 80 per cent. of the total, were likely to alter the existing arrangements, to which their representatives had agreed.

Mr. Blundell asked whether Sir K. Wood was aware that the dentists were following in the footsteps of the doctors. He asserted that unless some steps were taken they might in very many cases obtain remuneration out of proportion to the services they rendered. Sir K. Wood replied that approved societies and members of the dental profession both thought they had made a bad bargain. Consequently he inclined to think this a fair arrangement.

Replying to Mr. Rhys Davies in writing, Mr. Chamberlain said the number of claims for dental and other treatment benefits in proportion to membership undoubtedly varied between the different approved societies, but he had no evidence that this was to be explained by the failure on the part of some societies to carry out the requirement that they should send notice to all their members of the additional benefits provided. He did not think it necessary to inquire of every society as to the manner in which this requirement was carried out.

Mental Deficiency Bill.

The Mental Deficiency Bill came before a Standing Committee on December 7th. On the motion of Dr. Vernon Davies the word "strong" was omitted from the definition of "moral defective" as a "person in whose case there exists mental defectiveness coupled with strong vicious or criminal propensities." Mr. Chamberlain said he could accept the amendment, and Dr. Fremantle supported it, saying that to define mental deficiency was most difficult. The amendment was carried.

Mr. Atkinson called attention to the fact that there were no words in the definition of mental deficiency which would cover cases of encephalitis lethargica in an adult. The definition was limited to "arrested or incomplete development of mind." He moved to add "mental disturbance" to cover cases where the mind was deranged by disease after full development. Mr. Chamberlain said the Board of Control had never heard of moral imbecility following encephalitis lethargica in an adult. The exclusion of adults from this bill was deliberate, and even if cases of such sequels occurred in adults they should still be excluded. The colonies contemplated by the bill were only suitable for young persons. At present adults could only be dealt with as lunatics. Dr. Fremantle said the separate system of dealing with mental deficiency in young persons had been deliberately built up—something quite distinct from mental hospitals—but the ordinary law of lunacy should be developed to allow of more treatment in mental hospitals. The number of institutions available for mental defectives in the ordinary sense was inadequate and should not be employed for adults. Answering a question, Mr. Chamberlain said he was informed that the maximum age at which mental development was completed was 25. Dr. Fremantle pointed out that the structure of the mind was deemed to be completed at 17 to 21. Mr. Atkinson's amendment was defeated. Dr. Vernon Davies moved similar amendments to extend the bill to "perverted" development of mind at any age as well as "arrested" development. Mr. Chamberlain said the addition of "perverted" would include adults, and he could not accept it. The Committee supported Mr. Chamberlain. In reply to Mr. R. Morrison, Mr. Chamberlain said that the original definition of mental deficiency had proved too narrow. It was now recognized that mental deficiency need not be innate. Causes beside disease and injury might subsequently be recognized, and elasticity should be allowed lest unfortunate persons should be deprived of the protection of the bill. After some remarks by Dr. V. Davies the motion was not pressed. The Committee accepted an amendment by Mr. Chamberlain to make plain that the bill allowed mental defectives to be placed under supervision or guardianship or sent to an institution. Mr. Atkinson moved that three years should be substituted for five as the period during which the mental defective could be detained in an institution without re-examination. Mr. Chamberlain said that with the doubtful case of encephalitis lethargica there was scarcely any prospect of improvement in three years. The Board of Control would inspect the institutions twice a year and had absolute power to discharge at any time children thought to be cured. Dr. Davies said the investigations of the Royal Commission showed that no cases of illegal detention could arise. Mr. Chamberlain reminded the Committee that the first detention was for one year, not for five. There was no danger of cases of improvement being overlooked. Mr. Atkinson's amendment was defeated. The same member then moved that the Board should see that the mental defective was informed of his right to be examined by an independent doctor. Mr. Chamberlain gave a pledge that this would be done administratively. Sir Kingsley Wood moved to extend the safeguards of the bill to mental defectives placed in an institution by a parent or guardian. The Committee agreed. Dr. Davies moved that examination should be separately made by two medical men. He did this to protect medical men, who were nervous of these cases, fearing that they would be sued for damages. Mr. Chamberlain pointed out that the examination referred to in the bill was only of persons absent from an institution. The amendment was defeated. The Committee agreed to a proposal to authorize the local authorities to provide "occupation" where mental defectives could not benefit by "training," and consequential amendments were made. In reply to Mr. Tom Williams, Mr. Chamberlain said that only a small proportion of counties had provided institutions for mental defectives, but some had made arrange-

IN connexion with the scheme drawn up by a committee of the International Society of Medical Hydrology for teaching this subject at the universities and medical schools, nearly sixty medical graduates and students of Bristol University recently visited Bath. A lecture demonstration was given at the Royal Mineral Water Hospital by Dr. Vincent Coates, dealing especially with rheumatic affections of muscular and fibrous tissue, infective arthritis, metabolic arthritis, and osteo-arthritis, cases being shown to demonstrate each type. This was followed by a visit to the Royal Baths, where demonstrations of hydrotherapy were given, and to the accessory department of the bathing establishment, which included ultra-violet rays, radiant heat, Bergonié treatment, diathermy, etc.

A DESCRIPTION of the new radiological department at the Royal Infirmary, Edinburgh, appeared recently in the *Electrical Review*, and has now been reprinted in pamphlet form by Watson and Sons (Electro-Medical), Ltd., who were responsible for the supply and installation of the *x*-ray and electro medical apparatus. The reprint is fully illustrated and gives a good idea of the excellence of the department, the opening of which by the Duke of York was reported in our issue of October 16th (p. 710).

THE late Mr. Oscar Wilkinson by his will bequeathed £1,000 each to the Scarborough Hospital and Dispensary, the Scarborough Cottage Hospital, the Scarborough Convalescent Home for Children, the Hull Royal Infirmary, the Sheffield Royal Infirmary, the Cancer Hospital, Brompton, St. John's Hospital for Diseases of the Skin, Leicester Square, W.C., and St. Dunstan's Hostel for the Blind.

THE eighth edition of Treves's *Surgical Applied Anatomy*, revised and enlarged by Professor C. C. Choyce, will shortly be published by Cassell and Co., Ltd. It includes a number of new illustrations.

In the October number of the *Quarterly Review of Biology* there is an illustrated article on the foetal growth of man and other primates, by Adolph H. Schultz, of the department of anatomy of the Johns Hopkins University. He finds that human racial differences, and all distinctions between man and apes or monkeys, increase during some periods of embryonic growth, and never become less with advancing development. This is held to support the current theory of one common ancestry for all the primates. The journal may be obtained from Messrs. Baillière, Tindall and Cox, 7, Henrietta Street, Covent Garden.

THE annual report of Livingstone College for 1925 to 1926 quotes warm appreciations of the work of the college by missionaries in Labrador, Kenya, Siam, and North China. In addition to the full session of nine months' medical training for missionaries from October to June, a vacation course is held in July, and intensive three-day courses of lectures in the care of health in the tropics are given in March, September, and December. Further information may be obtained from the Principal, Livingstone College, Leyton, E.10.

THE late Mr. Thomas Martin of Pollokshields has by his will bequeathed £2,000 to the Royal Hospital for Sick Children, Glasgow, to endow a "Margaret Inglis Sim" cot; £1,000 to the Glasgow Royal Cancer Hospital, to be used especially for research work; £1,000 to Biggart Hospital Home, Prestwick, to endow and name the "Margaret Ingis Sim" cot; and £1,000, or such sum as may be required, to the West High and Cottage Hospital, to endow the "Margaret Inglis Sim" bed. The residue of the estate, subject to other legacies and certain annuities, is left in equal shares to the East Park Homes, Glasgow, the Maternity Hospital, Glasgow, and the Samaritan Hospital, Glasgow.

THE sanitary condition of Moscow, according to a statement in the *Münchener medizinische Wochenschrift*, is in many respects better to-day than in 1913. Several epidemic diseases are less prevalent than before the war, as is shown by the following figures: typhus, 320 cases in 1913, 240 in 1925; relapsing fever, 64 cases in 1913, 50 in 1925; dysentery, 800 cases in 1913, 320 in 1925; diphtheria, 4,600 cases in 1913, 2,000 in 1925; small-pox, 217 cases in 1913, 10 in 1925. Enteric fever is an exception to the rule, owing to the bad water supply and consumption of raw milk, there being 2,500 cases in 1925 as compared with only 1,000 in 1913.

ON the occasion of the thirtieth anniversary of the foundation of the Dutch Dermatological Association, on October 24th, Drs. J. J. Jadassohn of Breslau, E. Finger of Vienna, Darier of Paris, C. Rasch of Copenhagen, P. G. Unna of Hamburg, Levaditi of Paris, G. Pernet of London, B. Bloch of Zürich, and J. Almkvist of Stockholm were elected honorary members.

AT Exeter police court, on December 2nd, a man was sentenced to two months' imprisonment for the theft of a stethoscope, collodium, and soda tablets from a chemist. He is stated to have obtained these by pretending to be a qualified medical practitioner.

Letters, Notes, and Answers.

All communications in regard to editorial business should be addressed to ***The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.***

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the BRITISH MEDICAL JOURNAL alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the BRITISH MEDICAL JOURNAL must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the JOURNAL, should be addressed to the Financial Secretary and Business Manager.

The ***TELEPHONE NUMBERS*** of the British Medical Association and the BRITISH MEDICAL JOURNAL are *MUSEUM 9861, 9862, 9863,* and *9864* (internal exchange, four lines).

The ***TELEGRAPHIC ADDRESSES*** are:

EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology Westcent, London.*

FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westcent, London.*

MEDICAL SECRETARY, *Mediocra Westcent, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737 Dublin), and of the Scottish Office, 6, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 4361 Central).

QUERIES AND ANSWERS.

"W. J. K." asks for advice in the treatment of a long-standing, progressive, and pronounced case of obesity.

TREATMENT OF TINNITUS.

"DR. P." would like to know whether success has ever followed puncture of the tympanum in cases of very troublesome tinnitus. Every other treatment has been tried without avail. The patient is 56 years of age.

NERVOUS RETCHING.

"S. P. S." writes to suggest that "H. T.'s" patient should try sucking small pellets of camphor.

"M.B., B.CH., B.DENT.SC." writes in reply to "H. T.": May I suggest (1) that the filing away of the back of an upper denture and the production of a fine thin edge are often sufficient, but in cases of very nervous patients (2) massage of the hard palate by the patient with the back of a small teaspoon, after sucking a "Rhodia pastille containing scuroforme" (made by L. Durand, 21, rue Jean Goujon, Paris 8e), and (3) the application of a little oil of cloves to the palatal surface of the denture will, in a short time, overcome the nervous retching.

LICE ON DOGS.

DR. J. AUBREY IRELAND (Shrewsbury) writes with reference to the reply given on December 4th (p. 1087): As one who has bred show and working dogs for the last thirty years I have from time to time had trouble with lice, and, after trying many methods, I am convinced that much the best way is to use oil of sassafras (synthetic). A little (a drachm or two for a 20 lb. terrier) shaken over the dog from a sprinkler-top bottle and well rubbed in, particular attention being paid to the neck and around the ears, will disinfest the dog in a couple of days; he should then be washed. Care must be taken that he is kept in an airy place, as if shut up in a close box he is liable to be overcome by the fumes. I have not found it necessary to repeat the dressing, but of course the bedding, etc., should be cleansed or renewed.

TREATMENT OF PRURITUS ANI.

DR. ALFRED A. MASSER (Penistone) writes: I note with satisfaction the importance attributed to the cleansing of the hands following defaecation. As your readers probably know, it is part of the ritual of the Jewish race to wash the hands after defaecation with the uttering of a prayer. I feel confident that the rarity of parasitic intestinal worms in this race is to great extent attributable to this ancient rite, which is closely observed by most Jews. Water is also poured over the hands prior to partaking of any food, which traditional law might be put into practice with great benefit by other races. In my own experience of the treatment of pruritus ani, where no general or local cause can be found, the application of pure liquor picis carbonis on three successive nights, together with frequent cold douching of the anal region, has given great relief, and in many cases resulted in rapid cure.

INCOME TAX.

Sale of Practice.

"NESTOR" is likely to sell his practice as from September, 1927. How should his liability for 1927–28 be calculated, and should he pay certain expenses this year and so ensure that they affect the liability for that year? Past assessments have been on the "cash" basis, as regards both receipts and expenses.

*** Assuming that the change from the three years' average to that of the previous year takes effect for 1927–28, "Nestor"

Medical News.

WE have received a copy of the Labour party's *Report on the Nursing Profession*, which is to be submitted to a conference of nursing and kindred organizations at the Caxton Hall, Westminster, on January 28th. The report, which has been prepared by a subcommittee of the Standing Joint Committee of Industrial Women's Organizations and the Labour Party's Advisory Committee on Public Health, says it is undoubtedly the case that the nursing profession, consisting of those who have undergone a course of long technical training, is relatively worse off with regard to remuneration, hours, and general conditions of labour than any other similar group of workers. For probationers in hospital service, a forty-eight-hour week and an eight-hour day are recommended, together with a minimum salary of £40 a year, better living accommodation, an annual holiday of three weeks, no night duty during the first year's training, with not less than one full day a week and one week-end a month off duty. In regard to fully trained nurses in the hospital service, the report declares that the only way in which they can deal effectively with their conditions and exercise any sort of equality in bargaining power is for the profession to be organized on trade union lines. Until a national joint council, representative, on the one hand, of the nursing services, and on the other hand, of the State, municipal, and other employers concerned, can be inaugurated, certain minimum standards are laid down which the report states those responsible as employers should endeavour to see carried out. These include a forty-eight-hour week, not less than four weeks' annual holiday with full pay, rates of pay high enough to enable a nurse to live comfortably, to take a good holiday, and to contribute to a pension scheme which would give her the right to a pension at the age of 55 upon which she can live.

THE Central Midwives Board for England and Wales held a penal and an ordinary meeting on December 2nd. It was announced that the Ministry of Health had approved, subject to certain minor alterations and additions, the new rules for a period of one year from December 31st, 1926. A resolution recording the Board's appreciation of the valuable services rendered by the late Dr. W. E. Fothergill as an examiner at the Manchester-Liverpool centre was adopted.

THE managers of the Royal Institution have elected Mr. Julian Huxley, M.A., to be Fullerian Professor of Physiology. He has been Professor of Zoology at King's College, London, since 1925, and was formerly senior demonstrator in zoology at Oxford. He is the eldest grandson of Thomas Henry Huxley.

A NEW hospital for Dunbar is being prepared and will shortly be ready. The old Battery Hospital on the north side of Dunbar New Harbour has been closed, as it has suffered considerably from recent storms and is in a dangerous state.

DR. REGINALD S. PEARSON, Mayor of Lambeth, has called a meeting of medical men at his house, "The Hawthorns," 193, Clapham Road, S.W.9, to hear an address by Dr. Camac Wilkinson on tuberculin in the diagnosis and treatment of tuberculosis. The meeting will take place on Thursday, December 16th, at 4 p.m. All medical men interested are invited to attend.

THE last of the series of lectures arranged for this session by the Fellowship of Medicine and Post-Graduate Medical Association will be given by Mr. Ernest Clarke, on emergencies in ophthalmic practice, on Thursday, December 16th, at 5 o'clock, at 11, Chandos Street, Cavendish Square. This lecture is free to members of the medical profession. A further series of lectures on emergencies in medicine and surgery is being arranged for January, February, and March. There will also be a series of clinical demonstrations in ophthalmology and surgery, of which particulars will be announced later. Queen Charlotte's Hospital provides practical courses in obstetrics, lasting from two to four weeks; weekly courses in obstetrics and child welfare are undertaken by the staff of the City of London Maternity Hospital; and the Fellowship can arrange for clinical assistantships at the Samaritan Hospital. The following special courses will be held in January: a fortnight's intensive course in medicine, surgery, and the specialties at the Prince of Wales's General Hospital from January 10th to 22nd; a fortnight's all-day course in cardiology at the National Hospital for Diseases of the Heart, from January 17th to 29th (entries limited to twenty); a fortnight's course in diseases of children at the Royal Free Hospital and the Children's Clinic, from January 10th to 22nd; a month's course (Tuesdays and Saturdays at 11 a.m.) in psychological medicine at the Bethlem Royal Hospital, from January 11th to February 5th. Syllabuses of the special courses, the programme of the general course, and copies of the *Post-Graduate Medical Journal* can be obtained from the Secretary of the Fellowship.

THE Post-Graduate Hostel will hold three meetings next week at the Imperial Hotel, Russell Square, W.C.1, at 9 p.m. On Tuesday, December 14th, Professor C. A. Lovatt Evans, F.R.S., will discuss capillary circulation: on December 16th Mr. A. E. Mortimer Woolf will read a paper on pain; and on December 17th Dr. T. Wilson Parry will discuss the various holes discovered in the skulls of prehistoric man. Dinner at 8 o'clock (5s.). All medical practitioners are welcome.

A CHADWICK public lecture on legal conceptions of public health will be given by Mr. William A. Robson, B.Sc., Ph.D., Barrister-at-Law, in the Lecture Hall, Royal Sanitary Institute, 90, Buckingham Palace Road, on Monday, December 13th, at 8 p.m. Admission is free. Further information about Chadwick public lectures may be had from the secretary, Mrs. Aubrey Richardson, O.B.E., at the offices of the Trust, 13, Great George Street, Westminster.

AT an evening meeting of the Pharmaceutical Society of Great Britain, on Tuesday, December 14th, Mr. F. H. Carr, C.B.E., F.I.C., will open a discussion at 8 o'clock on the vitamins in their relation to pharmacy. The meeting will be held in the society's house, 17, Bloomsbury Square, W.C.1, and medical friends of members will be welcomed.

A CONGRESS of the Royal Institute of Public Health will be held in Ghent, from June 1st to 6th. The work will be divided into five sections—namely, State Medicine and Municipal Hygiene; Naval, Military, Air, and Tropical Diseases; Industrial Hygiene; Pathology, Bacteriology, and Biochemistry; and Women and the Public Health. The inclusive charge for first-class travelling, hotels, and excursions to Bruges, Brussels, and the Flanders battle-fields will be twelve guineas. It is stated that the Minister of Health is prepared to consider applications from sanitary authorities for sanction of the payment of the reasonable expenses of delegates, and that similar sanction has been obtained from the Scottish Office. Further information may be obtained from Dr. T. N. Kelynack, 37, Russell Square, W.C.1.

THE eighth Congress of the International Society of Surgery (to which Germans will be admissible) will be held at Warsaw, under the presidency of Professor Hartmann of Paris in July, 1929, when the following subjects will be discussed: (1) Causes and mechanism of post-operative embolism. (2) Results of resection of the stomach for gastric and duodenal ulcer. (3) Treatment of Graves's disease. Further information can be obtained from the general secretary, Dr. L. Mayer, 72, Rue de la Loi, Brussels.

THE thirty-sixth French Congress of Surgery will be held in 1927, under the presidency of M. Bégouin of Bordeaux. The subjects to be discussed include drainage in abdominal surgery, chronic pericolitis and epiploïtis, and the results of periarterial sympathectomy in affections of the limbs.

AN international post-graduate course will be held in Vienna from February 7th to 20th, and will deal with neurology and psychiatry from the therapeutic standpoint. Further information may be obtained from Dr. A. Kronfeld, 22, Porzellangasse, Vienna IX.

THE Fourth English-speaking Conference organized by the National League for Health, Maternity and Child Welfare was held from July 5th to 7th, and attracted an audience of nearly 1,000 people from twenty-four different countries. The verbatim report of the proceedings has now been published and may be obtained from the headquarters of the League at Carnegie House, Piccadilly, W.1, price 2s. 6d. Among the subjects dealt with are the prevention of rheumatic heart disease in young children, the care of children in the first five years of life, and publicity methods in maternity and child welfare.

THE address of the Board of Control (Lunacy and Mental Deficiency—England and Wales) is now Caxton House West, Tothill Street, Westminster, S.W.1. Telephone number: Victoria 8540. Telegraphic address: Avicenna, Sowest, London.

THE Council of the Harveian Society of London has selected the following subject for the Buckston Browne Prize: "The pathology, diagnosis, and treatment of new growths originating in the walls of the urinary bladder." The prize, consisting of a medal, together with the sum of £100, will be awarded for the best essay on this subject. It is open to any member of the medical profession registered in the British Isles or Dominions, and is limited to candidates under 45 years of age. Essays must be sent in by November 1st, 1927. Further particulars may be obtained from the honorary treasurer, Dr. G. de Bec Turtle, 81, Cambridge Terrace, Hyde Park, W.2.

ON his retirement from the position of school medical officer at Hull Dr. James Fraser has been presented by the education authority with a framed resolution of appreciation of his service, engrossed on vellum.

should see that any expenses which would ordinarily be paid in 1926 are not postponed to 1927, but it would perhaps be unwise to anticipate payments which would normally fall into 1927. If the inspector of taxes has reason to suppose that owing to any departure from the usual procedure the cash basis has ceased to reflect the full earnings of the practice, he would be quite justified in refusing to accept that basis. For 1927–28 "Nestor" will be liable in respect of one-half of the assessable profits; the balance of the assessment will have to be dealt with by his successor.

Motor Car Transactions.

"J. H. P.'s" transactions have been as follows: In August, 1925, he bought a motor cycle for £45, and in May, 1926, sold it for £25 and bought a motor car for £149. In August, 1926, he sold the motor car for £135 and bought another for £235. The changes were effected because the original cycle and car were unsuitable.

*** In his assessment for 1926–27 "J. H. P." is entitled to depreciation on the vehicle held at the end of 1925–26 *plus* (as an expense of the year 1925–26) the cost of replacing the cycle. The inspector is, perhaps, a little lenient in making the second deduction, as the exchange does not seem to have been due to obsolescence. On the whole the total allowance made seems reasonable, but it should, of course, be greater next year owing to the use of the more expensive car.

"A. B. C." bought a car in 1923 for £265 and replaced it in 1925 with a bigger, better car costing £360. The inspector of taxes refuses the "obsolescence" allowance on the ground that the car was not obsolete.

*** If, as may very well have been the case, the 1923 car had become unsuitable for the work required of it, we consider that "A. B. C." was fairly entitled to regard it as obsolete for his purposes and to claim the obsolescence allowance. If that ground of claim fails, "A. B. C." might consider whether it would not be better for him to give up his claim to the percentage allowance on the new car, and continue now and in the future to deal with the question by claiming the costs of renewal as and when incurred. We assume that he did not receive a depreciation allowance for 1925–26.

LETTERS, NOTES, ETC.

OSTEO-ARTHRITIS OF THE HIP-JOINT.

DR. W. J. MIDELTON (Bournemouth), in the course of a note on Dr. Warren Crowe's article on osteo-arthritis (November 6th, p. 834), emphasizes the point that in all cases the non-specific toxin was used over a long period. Dr. Midelton maintains that there is no difference etiologically between osteo-arthritis and rheumatoid arthritis, and attributes the pain in the former case to muscular spasm. By crossing the foot of the affected limb over the tibia of the other leg great pain is elicited, and this he regards as diagnostic. He has successfully treated a case of osteo-arthritis by multiple acupuncture and irritants, and another by galvano-cautery of the back, close to the spinal column. He refers to Petersen's theory that the effects of the cautery, blister, and seton come under the heading of non-specific protein therapy.

TREATMENT OF CARBUNCLE.

SIR JOHN O'CONOR (Buenos Aires) invites surgeons who, irrespective of coincidental diabetes, treat carbuncle by excision, crucial incisions, or fulguration, to give the following physiological method a trial and note the result at the end of fourteen days. Except when the patient is asleep, apply fomentations of a hot corrosive sublimate (1 in 3,000) every hour, avoiding employment of any impermeable tissue in the superimposed dressing, which should consist merely of a good pad of absorbent wool and a bandage. In combination with this local treatment the patient should be fed up, not omitting his co-efficient of alcohol.

MAD DOGS.

SOME of the more excitable portions of the lay press have recently given considerable prominence to accounts of what they call viciousness or treacherousness among some of the larger breeds of dogs, and it may be of interest to explain what really is happening.

Shortly after the war a breed of dog was introduced into this country from the Continent and it immediately became popular under the very misleading name of the Alsatian wolfhound—misleading because it was not an inhabitant of Alsace, has no connexion whatever with a wolf, and is not a "hound." This breed of dog has been known for centuries on the Continent as the German or Continental sheep dog or shepherd dog—titles which adequately describe the dog and its function. It is very closely related to our own collie, and in pure bred litters of "Alsatians" pups are sometimes met with which are almost indistinguishable from a short-haired collie. Like the collie, it is a highly strung and extremely intelligent animal, but very nervous. The sudden access of popularity immediately after the war caused very intensive breeding from insufficient stock, and with it came all the evils of inbreeding. Many breeders avoided inbreeding by the continued importation of fresh blood from abroad, but in some cases this was not done, and this is, in part at least, responsible for the recent scare. In a few cases dogs, otherwise affectionate, suddenly became mad—became, indeed, the canine equivalent of a homicidal maniac—and savaged their owners. This is liable to happen in all breeds of dogs—and, indeed, several of the recent cases were in other breeds—but the popular belief, fostered by the name, that the Alsatian was crossed with a wolf, has caused the discredit of all of these cases to be given to this breed. The treachery of a half-bred wolf differs much from the cases under notice. Though such an animal may be obedient to its master, it never has the affection of the dog (and the "Alsatian" is "all dog"), and its behaviour is such as to make one expect treachery if given a suitable opportunity. It is unfortunate that a pure dog should have been so unsuitably labelled; it is the more unfortunate because the wolf-like characters are really dog characters which have been less distorted by the breeder than in most of the other animals which have come under their charge.

It is important, too, for laymen in general to understand that rabies does not now exist in this country, and that, under the very stringent conditions of quarantine imposed by the Ministry of Agriculture on all canine animals entering Britain, it is unlikely ever to gain a foothold here. The layman does not understand this, nor does he understand that a bite from a dog (even from a mad dog) which is not rabid will have little more result than a bite from any other animal. It may cause a local abscess or even more general symptoms, but it can never cause hydrophobia. The medical profession could do a considerable public service and allay much public apprehension by giving prominence to these facts.

AN ANCIENT NEEDLE.

DR. SEYMOUR W. DAVIES (Wallasey) writes: The note by Dr. G. Varian in the BRITISH MEDICAL JOURNAL (September 18th, p. 548) entitled "An Ancient Needle" reminds me of a case I saw about three years ago. A man, about 55, who has tabes dorsalis in a mild form, which does not prevent him from following his occupation of accountant, complained of a sudden pain in his left thigh, about Scarpa's triangle. The pain was followed by ecchymosis and a tender hard nodule in the skin. I ordered lead and opium lotion and Donovan's solution, thinking that he had phlebitis or thrombosis. Ten days later the swelling fluctuated and I aspirated 2 drachms of altered blood. A week later I felt a foreign body under the skin, injected novocain and extracted a darning needle 4 in. long and clean, though discoloured. The only explanation was that the needle had slipped from his desk into his "lap," and had been driven inwards by flexion of the thigh. His tabetic state would presumably account for his not noticing pain, though his sensibility to the pain of the events described above was normal enough. I may say that he is a sober man and the case has remained a puzzle to me.

MEDICINE IN FICTION.

IN the current number of the *Newcastle Medical Journal* Dr. Hugh Dickie, following in the footsteps of Sir Squire Sprigge, sets forth something of the "Nosology of the novelist," illustrated by excerpts from works by modern authors. Thus from *The Great Babylon Hotel* of Mr. Arnold Bennett he culls what is probably the most complete account ever written of the symptoms of that mysterious disease "brain fever": The patient, Prince Eugen, had a flushed face and unequal pupils. He muttered and whined. When he got up he staggered and fell in a swoon. At this point his eyes closed, and he breathed through his nostrils. His fingers contracted, and from time to time general convulsions occurred. It is satisfactory to learn that prognosis in these cases is good, and that perfect recovery in body and mind is possible. After such a formidable disease the description by Hugh Conway of a patient operated on for double cataract at one sitting, with immediate restoration of sight and without the need for glasses, seems comparatively tame. Sir A. Quiller-Couch has a doctor who fortunately carries a bottle of bromide in his pocket, and when called to treat a madman who has just committed a murder, produces sleep and sanity with a dose of this potent drug. "Sapper," on the other hand, shocks the shade of Harvey by making the arteries convey to the heart a dreadful poison which has been placed upon the skin. Dr. Dickie suggests that the literary giant should consult his family doctor before committing these medical concepts to paper.

AN OPHTHALMOLOGICAL CURIOSITY.

A CORRESPONDENT sends us an extract from one of the Scottish newspapers describing the impressions produced upon an American journalist by an audience with Signor Mussolini. Il Duce, according to this keen observer, "has a very winsome smile, looks at you with distinct directness, has brilliant black eyes, with a trick of enlarging them, showing wide rings of white cornea around the retina." This annular corneo-retinal phenomenon has not, we believe, been described hitherto in any detail.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 38, 39, 40, 41, 44, and 45 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 42 and 43.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 251.